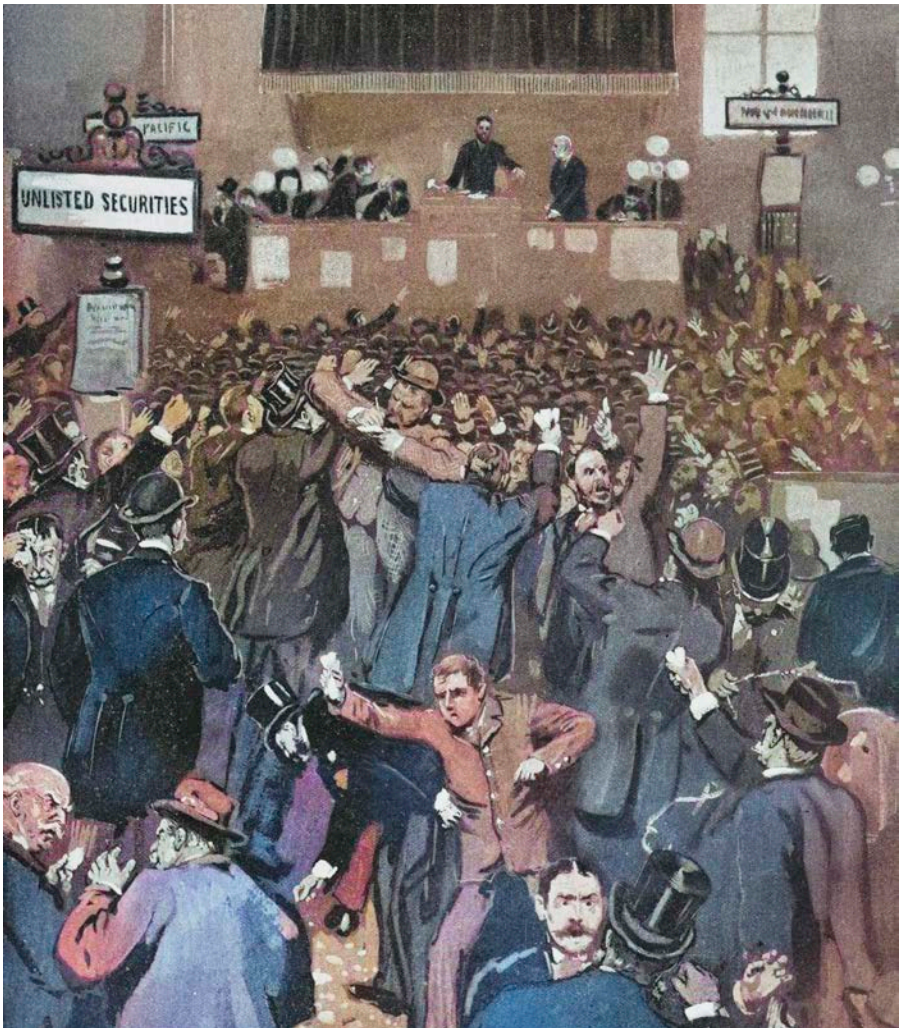
FINANCIAL HISTORY

THE MAGAZINE OF THE MUSEUM OF AMERICAN FINANCE



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ISSUE 155 | FALL 2025

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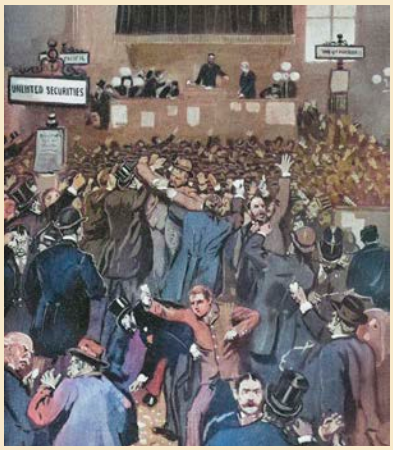
Drawing of panicked stockbrokers on May 9, 1893, from *Frank Leslie's Illustrated Newspaper*. See related article, page 32.



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Museum Prepares Exhibits for New Boston Location and Receives Collection Donation from Howard Marks

Message to Members

David J. Cowen | President and CEO

I am happy to report that work is well underway to develop the exhibits for our new facility on Commonwealth Pier in the Boston Seaport. We are working with the renowned exhibit design firm G&A Strategy and Design, as well as the Fidelity Center for Applied Technology (FCAT), to create world-class interactive exhibits based on our collections. We are working with several guest curators to develop the content, and we expect to open to the public on July 1, 2026. This will coincide with the Tall Ships coming to Boston Harbor for the nation's 250th anniversary celebration. Additional information on this project, including more detailed information on the exhibits and naming opportunities available in Boston, can be found on our website at www.moaf.org/Boston.

At our October Board meeting, we also added two new trustees. We're thrilled to welcome Lynn O'Mealia and Matthew Perconte to our Board. Lynn is a partner and the director of marketing at Loudon Investment Management, where she has led client development and marketing initiatives since joining the firm in 2010. Matt is a managing director in Protiviti's Risk and Compliance practice, the market leader for New York covering the New York City metropolitan area and a member of Protiviti's geographical leadership team. Matt replaces trustee Cory Gunderson, also from Protiviti, who was an active and dedicated member of our Board since 2015. Cory supported countless programs and initiatives at the Museum over the last decade, and while he will truly be missed, he expects to continue attending our annual Gala.

Also in October, we were excited to announce that Howard Marks and Oaktree Capital Management, L.P. have donated a complete bound set of Mr. Marks' memos in honor of the 35th anniversary of his first memo. The set, inscribed by Mr. Marks, has become part our permanent collection. A full compendium of the memos is available on Oaktree's website, and a special curated edition, *The Best of…*, featuring those memos determined to be the most impactful by Mr. Marks is available as well. Each memo in *The Best of…* is accompanied by a short introduction contextualizing the enduring relevance of his insights in today's market environment.

In 2024, Mr. Marks received our Lifetime Achievement Award for his outstanding contributions to the financial community. We are thrilled to house these seminal works within our permanent collection. As the preeminent institution chronicling the evolution of American finance, we are committed to preserving and sharing the ideas that have profoundly shaped markets and investor behavior—and Howard Marks' memos achieve exactly that. $

Left: Representatives of the Museum of American Finance and the Fidelity Center for Applied Technology (FCAT) ring the Nasdaq closing bell, August 27, 2025. Pictured left to right: Erich Umar (FCAT), David Cowen (MoAF) and Seth Brooks (FCAT).

Right: Howard Marks signs a bound set of his memos for the Museum's permanent collection.

Risk, Return and Rembrandt: The Heist

By Brian Grinder and Dan Cooper

On that day, when evening had come, he said to them, "Let us go across to the other side." And leaving the crowd, they took him with them in the boat, just as he was. And other boats were with him. And a great windstorm arose, and the waves were breaking into the boat, so that the boat was already filling. But he was in the stern, asleep on the cushion. And they woke him and said to him, "Teacher, do you not care that we are perishing?"

— Mark 4:35–38 ESV

The sound of a knife slashing through the 357-year-old canvas disturbed the eerie silence of the Isabella Stewart Gardner Museum. It was early morning, the day after St. Patrick's Day 1990. Perhaps the painting itself cried out, "Do you not care that we are perishing?" as the knife crudely cut it from its stretcher boards. Paint flakes drifted to the floor as the knife finished its dastardly deed. Rembrandt Van Riijn's masterpiece then disappeared into the night, never to be seen again.

Christ in the Storm on the Sea of Galilee was one of Rembrandt's earlier works. It was painted in 1633 before Rembrandt moved from his hometown of Leiden to Amsterdam. It was the only known seascape by the Dutch master.

Although *Christ in the Storm* dominated the Dutch Room of the Gardner Museum, it was not the most expensive piece of artwork stolen that night. *The Concert*, a rare piece by Johannes Vermeer, was also taken. In *Van Gogh Has A Broken Heart,* author Russ Ramsey estimates that *The Concert* was worth about $200 million, whereas *Christ in the Storm* was worth about $100 million. All told, over half a billion dollars' worth of art was stolen from the museum. At the time, it was the largest art heist in history.

The two thieves gained entrance by posing as police officers and using the museum's intercom system to contact a security guard. They asked him to let them in to investigate a report of a disturbance in the museum's courtyard. Upon gaining entry, the thieves quickly bound the two security guards on duty with duct tape and marched them down to the basement, where they were handcuffed and warned to keep quiet.

Over the next 80 minutes, the thieves had free access to a museum filled with priceless masterpieces. Their take included one Vermeer, three Rembrandts, several Degas and various other pieces of art. In spite of a still standing $10 million reward for information leading to the recovery of the stolen

Rembrandt's 1633 painting, *Christ in the Storm on the Sea of Galilee*, was stolen from the Isabella Stewart Gardner Museum in 1990 and has yet to be recovered.

An empty frame remains where *Christ in the Storm on the Sea of Galilee* was once displayed. Picture provided by the FBI showing the empty frames for missing paintings after the theft at the Isabella Stewart Gardner Museum.

The Gardner Museum's Raphael Room, with its striking red walls and its collection of 15th- and 16th-century Italian Renaissance paintings.

items, nothing has ever been recovered. *Christ in the Storm* is "in the wind."[1]

Boston's Gardner Museum became the home of *Christ in the Storm* when it opened in 1903. Gardner and her husband Jack purchased the Rembrandt in 1898 shortly before Jack's untimely death. Isabella went on to create her museum in the Fenway neighborhood of Boston not far from Fenway Park.[2]

Isabella was the daughter of a wealthy New York steel magnate. Her husband Jack was a wealthy Boston brahmin. The couple travelled the world. Isabella was a passionate art collector who eventually began to focus on acquiring only the greatest masterpieces. Jack, an acquiescent husband, left the collecting to Isabella while he managed the family business.

Isabella's dream of building a museum where she could safely display her art treasures to the public began to take shape towards the end of the 19th century. She paid attention to every detail of the museum and left a healthy endowment for operating it after her passing. However, as the value of her masterpieces increased dramatically, the museum failed to properly assess the increased risk of theft. Security was lax. The security guards were poorly paid and poorly trained college students. The security system was lacking, and none of the stolen art was insured.

Ramsey observes that, "The empty frame is a note from the thief that tells Isabella that though she may want to create something beyond the reach of death, that is not something this world affords. She can dress up the pain all she likes, but nothing she has made will last forever. This is a world where thieves break in and steal. It is a place where beautiful things are destroyed, where precious treasures are sold for a pittance, where talents are buried in the ground, never to be seen again." It is a world of ever-present risk.

No one understood the history of risk better than Peter Bernstein. His book *Against the Gods: The Remarkable Story of Risk* is a classic tale of how humans through the centuries dealt with risk and how the quantification of financial risk in the 1950s paved the way for modern risk management techniques. His key insight about risk is worth restating in full:

> The revolutionary idea that defines the boundary between modern times and the past is the mastery of risk: the notion that the future is more than a whim of the gods and that men and women are not passive before nature. Until human beings discovered a way across that boundary, the future was a mirror of the past or the murky domain of oracles and soothsayers who held a monopoly over knowledge of anticipated events.
>
> A rational process of risk-taking… provided the missing ingredient that has propelled science and enterprise into the world of speed, power, instant communication, and sophisticated finance that marks our own age. Their discoveries about the nature of risk, and the art and science of choice, lie at the core of our modern market economy that nations around the world are hastening to join.

Although *Christ in the Storm* appears on the front cover of the book's dust jacket and as an illustration in the chapter on marine insurance, Bernstein never discusses it in the text of the book.[3] This is unfortunate because we can learn a great deal about risk from the artist, from the painting itself and from the 1990 robbery that deprived us of this grand work.

The painting and the artist will be addressed in subsequent columns. The theft illustrates the importance of continual reassessment of risk exposure, especially when assets experience dramatic increases in value. The Gardner Museum, according to security expert Ulrich Boser, "has also become one of the most well-protected art institutions in New England." Nevertheless, the whereabouts of

the stolen paintings is still a mystery.

We like to think that some kid in the Boston area found the rolled-up masterpiece in his grandparents' attic, stole it from them, took it to his well-built treehouse and tacked it up on the wall where he and his playmates look at it as they make up stories about the terrors of the seas and other piratey things. $

Brian Grinder is a professor at Eastern Washington University and a member of Financial History*'s editorial board. Dr. Dan Cooper is the president of Active Learning Technologies.*

Notes

1. In *Rembrandt Is in the Wind*, Russ Ramsey describes any piece of artwork that is unaccounted for as "in the wind."
2. Gardner called her museum Fenway Court, but the name was changed to the Isabella Stewart Gardner Museum after her death in 1924. According to biographer Natalie Dykstra, Gardner was a huge fan of the Boston Red Sox. She attended every home game of their victorious 1912 World Series over the New York Giants.
3. He mentions Rembrandt's *The Anatomy Lesson* (1632) in the introduction, but he never discusses the painting that graces the front cover of the dust jacket.

The courtyard of the Isabella Stewart Gardner Museum in Boston.

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Courtesy of the Abbott Historical Archives

Women Pioneers
OF CORPORATE AMERICA

By Stephanie Cuba

Long before gender equality and corporate social responsibility made headlines, a handful of extraordinary women quietly—but powerfully—shaped the American business landscape from within its highest ranks. In the late 19th and early 20th centuries, when boardrooms and executive suites were exclusively male, women like Clara Abbott, Anna Bissell, Lettie Pate Whitehead Evans and Marjorie Merriweather Post not only secured seats at the table—they helped build the table. While following different paths into corporate life, these trailblazing women shared a strategic mind for business, a belief in their rightful place at the helm and an unshakable determination to do well by doing good.

All four are worthy role models who steered companies that remain global powerhouses today: Abbott Labs, Bissell Homecare, Coca-Cola and General Foods. Abbott was the first woman to serve on the board of a major US company (1900) and Bissell was the first female chief executive officer (CEO) of a large US company (1889)—both central to their companies' prosperity. Evans helped build the Coca-Cola bottling company before serving with distinction on Coca-Cola's board for two decades, while Post expanded General Foods globally and supported the 1930s movement for gender diversity on boards.

These women demonstrated how commitment to both customers and employees enable a corporation to grow for the benefit of shareholders. In forging such virtuous circles, these women were capitalists with a soul—relevant models amid ongoing debates over shareholder primacy, stakeholder interests and gender diversity.

Left to right: Clara Abbot, Lettie Pate Whitehead Evans, Anna Bissell and Marjorie Merriweather Post.

Clara Abbott: America's First Female Corporate Director

Decades before the 19th Amendment granted women the right to vote in America, Clara Abbott (1857–1924) became the first woman director of a US public company. She used her seat to guide the early strategic growth of Abbott Labs and instill a culture of corporate responsibility.

Born in 1857 in Pomfret, Vermont, Clara married her childhood sweetheart, Dr. Wallace C. Abbott, in 1886, shortly after he received his MD from the University of Michigan. Dr. Abbott was both a physician who made house calls and a druggist who ran the fledgling company from the family home in Chicago.

Clara Abbott served on the Abbott Labs board from 1900 to 1908 and again from 1911 until her death in 1924, when the company was still private. After Dr. Abbott's death in 1921, she inherited a significant ownership stake in the company about which she already had a deep understanding of its operations and values.

Through her board service, Clara helped steer the firm through World War I and the challenging postwar economy. She understood that companies have a duty primarily to their shareholders but also believed they had an obligation to employees and customers, who responded with dedication and trust

At her death in 1924, Clara's will established The Clara Abbott Foundation to benefit Abbott employees. She donated 12,000 shares of Abbott stock to be used "in furtherance of my beloved husband's profession and work."

Today, Abbott Labs employs 114,000 people in more than 160 countries and generates annual revenues exceeding $40 billion. The Clara Abbott Foundation, now worth more than $200 million, has for over 80 years provided Abbott families with assistance in healthcare, education and basic living expenses.

Clara Abbott's boardroom work and legacy exemplify the power of quiet leadership rooted in both business and social purpose. She stands as a clear example of how an organization's economic success and well-being are enhanced by cultivating lasting commitment from its customers and enduring trust among its workforce.

Anna Bissell: America's First Female CEO

At a time when most women were barred not only from voting but also owning property or holding leadership positions, Anna Bissell (1846–1934) rose to the helm of one of the most successful manufacturing companies in the United States. She did not merely manage her late husband's invention—she transformed it into a global household name.

Appointed as CEO of Bissell Carpet Sweeper Company in 1889, Anna became the first female CEO of a major American corporation. In this role, she was a forward-thinking leader who prioritized product quality, employee welfare, global strategy and ethical management—building the company's long-term value long before these became corporate buzzwords.

Her life began in De Pere, Wisconsin, where her family had settled after leaving Nova Scotia. Completing all the formal education available to her, she became a teacher at age 16. Three years later, she married Melville R. Bissell and settled in Kalamazoo, Michigan. Though Bissell would become a household name in carpet sweepers, this was not its original business.

The couple first ran a crockery and china business. All of the stock arrived in crates packed with sawdust, which became embedded in the carpets and proved nearly impossible to remove. In 1876, after numerous complaints from Anna, Melville invented the revolutionary carpet sweeper. When customers saw how much easier this made the cleaning, they wanted a sweeper of their own, and soon they were selling more sweepers than crockery.

Anna became a star salesperson, traveling from town to town to sell sweepers for $1.50 apiece. On a trip to Philadelphia, she persuaded department store pioneer John Wanamaker to carry the product.

After a fire destroyed the company's plant in 1883, Anna secured bank loans on reputation alone, enabling production to resume within 20 days. When Melville died unexpectedly in 1889, Anna—then in her early 40s and the mother of five children—stepped in to lead the company.

In the 19th century, widows often entered business out of necessity, but few excelled as Anna did. She didn't just maintain the company—she expanded it. One observer remarked that she "studied business the way other women of her time studied French." She kept pace with industrial complexities and mastered every facet of production.

Smith Collection/Gado

Headquarters of health care supply company Abbott in the Silicon Valley town of Santa Clara, California, July 25, 2017.

Most astutely, Anna recognized that the company's future depended on intellectual property and global branding. She trademarked the Bissell name in multiple countries and expanded the company's distribution into Europe and beyond, positioning Bissell as an international force.

Under Anna's leadership, by 1900 Bissell became the world's largest manufacturer of carpet sweepers. She modernized the company's operations and insisted on progressive employee policies—benefits, pensions and safe working conditions. She introduced fixed work hours, annual leave, a pension plan and an early version of worker's compensation—virtually unheard of at the time. She knew that all of these measures were the right things to do and good for business.

Anna believed in merit-based advancement, promoting employees on skill and dedication regardless of gender—extraordinary in an era when women rarely held supervisory roles. At her death, newspapers called her "a business executive without peer, a respected and beloved philanthropist and a true matriarch in her family."

More than 140 years later, Bissell Inc. remains one of the world's largest manufacturers of floor care products. Anna wasn't trying to be "the first woman CEO." She was trying to build a great company—and in doing so, she made history.

Lettie Pate Whitehead Evans: Business Trailblazer

Letitia Pate Whitehead Evans (1872–1953), business leader and philanthropist, was born in Bedford County, Virginia. Known as Lettie, she grew up in a nurturing family and attended private schools in Bedford and Lynchburg. In 1894, she married Joseph Brown Whitehead of Mississippi. The couple settled in Chattanooga, Tennessee, where he practiced law, and they had two sons.

In 1899, Joseph Whitehead and fellow attorney Benjamin F. Thomas approached Asa Candler, president of The Coca-Cola Company, with what seemed a "preposterous idea"—bottling Coca-Cola, then sold only at soda fountains. Candler granted them the exclusive rights to bottle and sell Coca-Cola across most of the United States. Improvements in bottling technology soon made the venture highly successful, and bottled soft drinks became a

lucrative staple of American consumer life. By 1900, Coca-Cola was sold in every state.

That same year, the partners created separate bottling companies to divide the national market. Joseph Whitehead joined John T. Lupton to establish the Dixie Coca-Cola Bottling Company (later Atlanta Coca-Cola Bottling Company) to serve the Southeast, along with bottlers in other regions. The Whiteheads moved to Atlanta in 1903, where they became prominent in business and society. Just three years later, Joseph died of pneumonia, leaving behind his widow and two young sons.

Lettie Whitehead took charge, becoming chair of Whitehead Holding Company and president of Whitehead Realty Company. She not only managed the businesses but expanded them aggressively—reorganizing operations, improving distribution networks and helping build one of the largest Coca-Cola bottling operations in the country. Her efforts to standardize and scale the bottling were key to Coca-Cola's rise as a national and global brand.

Lettie developed a close friendship and business partnership with Robert W. Woodruff, who became president of Coca-Cola in 1923. In 1934, she sold the family's bottling interests back to the Coca-Cola Company in exchange for stock, greatly increasing her wealth and stake in the enterprise. That same year, she joined Coca-Cola's board of directors, becoming one of the first women to serve on the board of a major American corporation. Her appointment was not symbolic; she was a respected and influential director, contributing meaningfully during a period of significant growth and change.

With her fortune secure, Lettie devoted herself increasingly to philanthropy. During World War II, she donated more than $50,000 to the Queen's Canadian Fund for Air Raid Victims, funded a Spitfire fighter plane for Britain that she asked to be named *Virginia* and provided ambulances for France. She also served as a trustee of the American Hospital of Paris.

Over her lifetime, she gave over $150 million to more than 130 organizations—equivalent to several billion dollars today. In 1945, she established the Lettie Pate Evans Foundation, to which she left her estate. The foundation continues to support educational and cultural institutions.

Lettie Pate Whitehead Evans was far more than a caretaker of her late husband's business. She was a pioneering executive and civic-minded leader whose vision and contributions helped Coca-Cola become the global brand it is today.

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We are constantly adding new improvements to our several Brands and invite your inquiries from time to time for Price-Lists and Descriptive Circulars.
All Sweepers of our Manufacture are Warranted.
"THE GRAND RAPIDS."
The most Popular Sweeper in the World.
SEND FOR PRICE-LIST AND DESCRIPTIVE CIRCULARS.
Bissell Carpet Sweeper Co. advertisement, 1887.

Marjorie Merriweather Post: Corporate Visionary

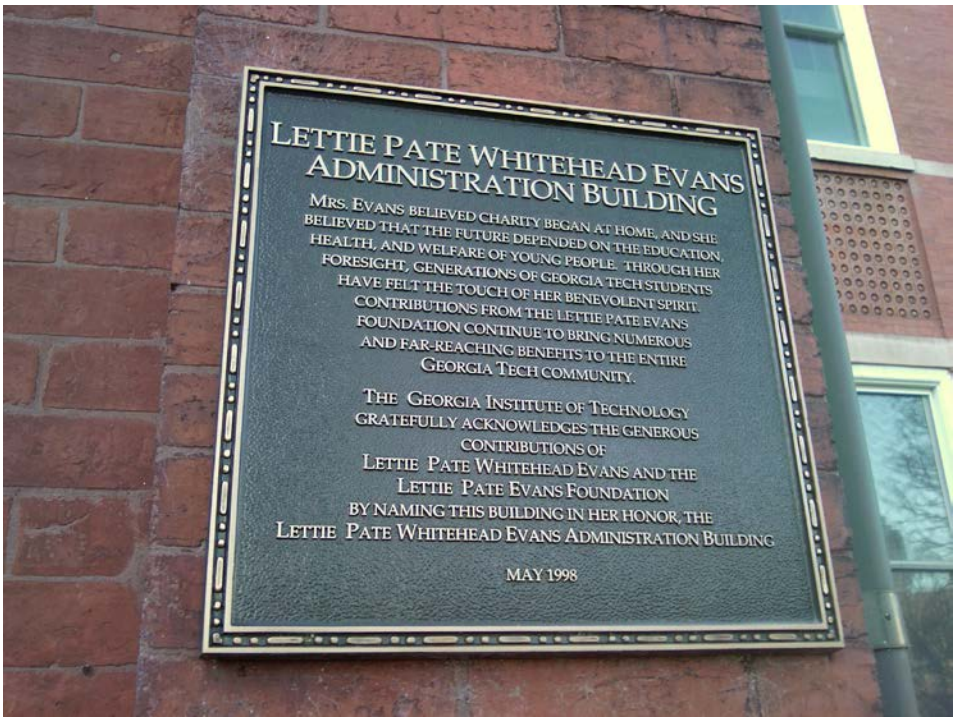
"Again, back in my Daddy's business!" scribbled Marjorie Merriweather Post (1887–1973) on the announcement of her appointment to the General Foods board in 1936. Though not officially on the board until then, her influence on the company had been evident since her father's death in 1915.

In 1891, when Marjorie was four, the Post family moved to Battle Creek, Michigan, where her father, C.W. Post, sought treatment from John Harvey Kellogg. Kellogg's use of breakfast cereals and coffee substitutes inspired Post to experiment with food manufacturing. Walking the neighborhood with her father, Marjorie watched women laboring in kitchens at dawn, a burden they hoped to ease. Out of that vision came Postum, a breakfast beverage, as well as Post Toasties and Grape-Nuts, cold cereals. These products were the foundation of the Postum Cereal Company, launched in 1895. By age 10, Marjorie was attending board meetings with her father and learning the business firsthand.

That same instinct to lighten household burdens guided her most famous decision: championing the 1929 acquisition of Clarence Birdseye's frozen food company. Drawing on vivid memories of her mother's laborious canning, she foresaw that Birdseye's ability to freeze vegetables, fruits, fish and poultry would transform the food industry. Her persistence persuaded both the General Foods board and her then-husband, financier E.F. Hutton, to make the purchase. It was a bold move that reshaped the American diet and put General Foods on the path to becoming a conglomerate.

By 1935, Marjorie owned 10% of General Foods stock and pressed for a board seat. With women's suffrage secured and Frances Perkins serving as Secretary of Labor, the case for women in leadership was gaining visibility. A broader movement was building to support gender diversity on boards—a cause endorsed by General Foods director Sidney Weinberg, senior partner of Goldman Sachs, with whom Marjorie would later serve for many years. In 1936, she formally joined the General Foods board, cementing her place among the first women to hold such a role at a major American corporation.

Her impact extended well beyond business. Committed to social welfare, the arts


LETTIE PATE WHITEHEAD EVANS
ADMINISTRATION BUILDING
MRS. EVANS BELIEVED CHARITY BEGAN AT HOME, AND SHE BELIEVED THAT THE FUTURE DEPENDED ON THE EDUCATION, HEALTH, AND WELFARE OF YOUNG PEOPLE. THROUGH HER FORESIGHT, GENERATIONS OF GEORGIA TECH STUDENTS HAVE FELT THE TOUCH OF HER BENEVOLENT SPIRIT. CONTRIBUTIONS FROM THE LETTIE PATE EVANS FOUNDATION CONTINUE TO BRING NUMEROUS AND FAR-REACHING BENEFITS TO THE ENTIRE GEORGIA TECH COMMUNITY.
THE GEORGIA INSTITUTE OF TECHNOLOGY GRATEFULLY ACKNOWLEDGES THE GENEROUS CONTRIBUTIONS OF LETTIE PATE WHITEHEAD EVANS AND THE LETTIE PATE EVANS FOUNDATION BY NAMING THIS BUILDING IN HER HONOR, THE LETTIE PATE WHITEHEAD EVANS ADMINISTRATION BUILDING
MAY 1998

Lettie Pate Whitehead Evans tribute plaque affixed to the front of Tech Tower at Georgia Tech, photographed in 2007.

Library of Congress

Marjorie Merriweather Post at her desk, circa 1942.

and public service, Marjorie approached every challenge with practical resolve: see the problem, orchestrate the solution. During World War I, when medical supplies were scarce, she sent an entire hospital to France; when the ship carrying it sank, she sent another. For these efforts she received the French Legion of Honor. During the Great Depression, she personally funded and supervised a Salvation Army feeding station and chaired a state unemployment relief committee.

Her personal life was as expansive as her philanthropy. With her second husband, E.F. Hutton, she lived in a 54-room Manhattan apartment, built the 118-room Mar-a-Lago in Palm Beach, cruised the seas on a four-masted yacht and built a lavish Adirondack camp that hosted foreign dignitaries. With her third husband, ambassador Joseph Davies, she lived in Moscow in the late 1930s, where she amassed an extraordinary collection of Russian art and decorative objects later housed at Hillwood in Washington, DC, which is now a museum.

Post's legacy is one of visionary leadership and enduring impact. She transformed a regional cereal maker into General Foods, a powerhouse of 20th-century consumer brands, through bold acquisitions and innovation. At the same time, her philanthropy enriched American cultural life and set a high standard for civic responsibility.

Though these remarkable women reached business leadership through different routes—inheritance, marriage or widowhood—they did so in eras when women were largely excluded from such roles. What began as necessity became visionary leadership that transformed their companies. They mastered the full range of business operations, from branding and intellectual property to global expansion and acquisitions, while recognizing that fulfilling their duty to shareholders required cultivating trust among employees and loyalty among customers.

Their stories deserve to be remembered not only because they shattered ceilings, but because they forged enduring models of corporate leadership. They were ahead of their time—and perhaps ahead of ours. $

Stephanie Cuba writes and speaks on professional development for university students and young professionals. She is a real estate developer and has served on the board of a for-profit charter school. Stephanie is co-author, with Lawrence Cunningham, of Margin of Trust: The Berkshire Business Model *and* The Warren Buffett Shareholder.

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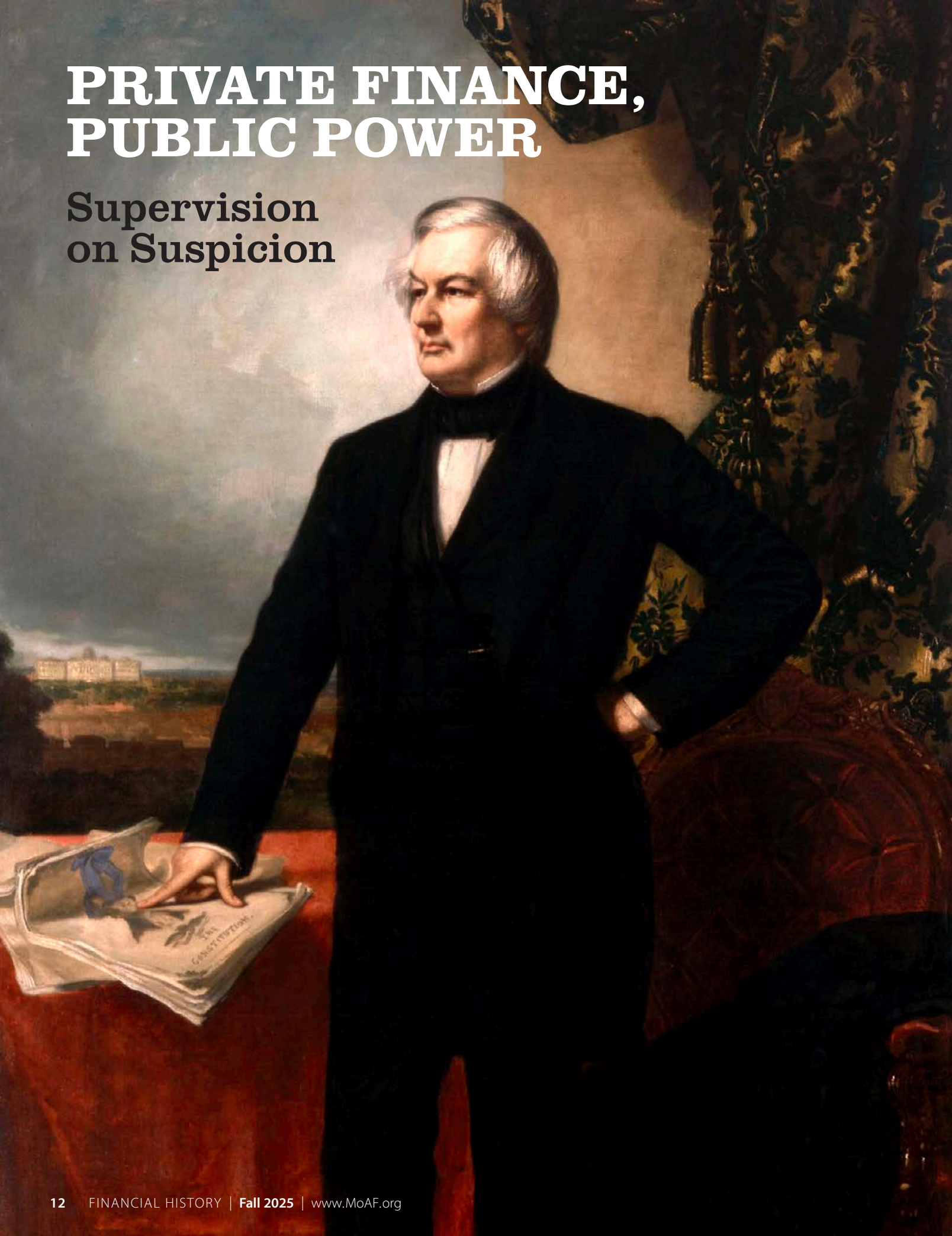
PRIVATE FINANCE, PUBLIC POWER

Supervision on Suspicion



By Peter Conti-Brown and Sean H. Vanatta

To the extent that Millard Fillmore, the 13th president of the United States, is remembered, it is not as a banking reformer. He's hardly remembered at all, one of a string of 19th-century presidents unable to halt the nation's march toward civil war. In his brief stint as New York's chief bank supervisor in 1848 and early 1849, however, Fillmore discerned the key failings of the state's financial oversight regime. Being Fillmore, he did little about it.

Born in a log cabin in upstate New York, Fillmore made his name as a Buffalo attorney and politician, first as an anti-Mason opposed to the candidacy of Andrew Jackson, and later as a Whig. He was a prominent member of the House of Representatives in the late 1830s and briefly retired to private life in the early 1840s before being elected New York State comptroller in 1847 on the way to the vice presidency in the election of 1848.

As comptroller—the state's chief fiscal officer—Fillmore inherited a vestigial bank supervisory authority, one which he deemed wholly insufficient. At the time, most bank oversight came through the market, as noteholders and depositors made judgements about banks' safety and soundness through their daily interactions with these financial institutions. Market surveillance was aided by a system of state mandated reporting, which required banks to publish their balance sheets at regular intervals.

In 1843, the New York legislature granted the comptroller the power to examine banks only when credible information suggested they had filed false reports or were in unsound condition. How the comptroller would acquire such information without prior access to the innerworkings of the banks was left unstated.

Official portrait of Millard Fillmore by George Peter Alexander Healy, March 4, 1857. Before he became the 13th president of the United States, Fillmore served a brief stint as New York's chief bank supervisor in 1848 and early 1849.

Fillmore's examination authority was a weak echo of what had come before: In 1829, the legislature enacted the Safety Fund Act, legislation which established a liability insurance scheme designed to protect the state's banking system by protecting bank noteholders and depositors from loss in the case of bank failure. To ensure that insured banks were sound, the Act also created a board of bank commissioners, who were empowered to undertake quarterly examinations. The bank commissioners visited the insured banks, inspected their books, interviewed their officers and tried to guide banks toward safety and stability.

New York's bank commissioners had little power to change bank behavior. They could advise, not compel. When the twin panics of 1837 and 1839 swept away many of the state's banks and bankrupted the safety fund, lawmakers did not seek to strengthen bank examination as an administrative function. Instead, in 1843 they abolished the board of bank commissioners and with them largely—though not entirely—abolished examination as well.

What remained for Fillmore was supervision on suspicion of fraud or insolvency. When creating this power, New York lawmakers added a new feature: Whenever the comptroller used this exceptional examination authority, the law required that he publish the results in the newspapers for the benefit of the public. Examination would thus be an adjunct to the reporting and market surveillance regime, providing information to private bank counterparties, without any scope for negotiation with bankers or discretion by state officials (it was more than a century before Congress would begin the process of rendering any such disclosure completely illegal).

Writing in January 1849, on the eve of assuming the vice presidency, Fillmore castigated the state's system of examination on suspicion as a wholly inadequate compromise between public and private risk management. "Whatever might have been the object, there can be no doubt that the effect of this law is to prevent examinations that might be useful," Fillmore complained.

Fillmore's ire had been raised by the failure of the Canal Bank of Albany in 1848 and the near failure of other banks connected with it. There was a political element to this dispute. Democrat Edwin Croswell, newspaper editor and Fillmore's political rival, controlled the Albany bank. Early in July, Fillmore had "heard some intimations unfavorable to the [bank's] solvency," and under the provisions of the law, he dispatched two examiners. Upon arrival, they immediately took possession of and closed the bank. The partisan press leapt on the story, gleefully skewering Croswell and his partners. "Among the many disgraceful bankruptcies in this State, there has probably never occurred one worse than this," the *Albany Atlas*, a rival paper, chortled.

The media reaction may not have been hyperbole. Fillmore's examiners found utter chaos inside the bank. The bookkeeper had "grossly neglected his business" leaving the books of the bank in "mystified and confused condition." After five days of work, state officials could only offer a partial report. They identified more than $300,000 in liabilities, including $189,000 in circulating notes and $63,000 in state deposits, against $1,102 in coin and "good current bank bills not exceeding ten or fifteen dollars." When they presented their full findings a month later, the examiners reported a nearly $200,000 hole in the bank, caused by the officers' habit of lending freely to "particular favorites" and to themselves.

Examination on suspicion of insolvency provided no check on the "illegal and improper practices" that had "for some years been perpetrated by bank officers."

That is not to say that examination on suspicion was useless: It could quell unfounded rumors against sound banks. Immediately after the Canal Bank's failure, *Thomson's Bank Note Reporter* listed the Pratt Bank of Buffalo as holding a large redemption account with the Albany bank. This was an error Pratt's officers sought to correct, yet the Canal Bank's examiners initially found supporting evidence in a $91,000 debt owed by the Pratt Bank on the Albany bank's books. In light of this apparent debt, "calculated to arouse at once…a strong suspicion of your stability," Fillmore ordered an examination of the Pratt Bank. Soon after, Fillmore published a brief report, which found the bank "in sound condition and prudently managed."

Courtesy of Heritage Auctions, ha.com

$1 bank note from the Pratt Bank of Buffalo, circa 1850s.

With this supervisory reassurance, pressure on the Pratt Bank subsided. Indeed, the Canal Bank's examiners later discovered that the Pratt loans were dummy entries that allowed the Albany bank's officers to lend still more money to themselves.

The public exoneration of the Pratt Bank suggests the one benefit of New York's examination system: The state could vouch for the soundness of suspect banks. Given the state's deep partisanship and the earlier failures of the Safety Fund's examination regime, it is not obvious that market participants would always credit such state pronouncements. The real weakness of supervision on suspicion, as Fillmore understood, was that undertaking public oversight in any but the direst circumstances posed an extreme danger. "Because it is known that an examination can only be made where there is ground of suspicion, the very fact of making it brings discredit upon the bank," Fillmore observed.

Fillmore had a solution: He called for annual examinations, undertaken by surprise, and "left to [the comptroller's] discretion whether the report of such examination should be published." Such a system "would tend greatly to restrain any abuse and to prevent fraudulent practices," an observation keenly informed by the Canal Bank's years of illegality and mismanagement. Surprise examinations, undertaken by public officials and published at supervisor discretion was a risk management system that had not been tried before. It was also one with an obvious conceptual flaw: Would the comptroller publish only the bad reports or only the good reports?

Fillmore, though, was on his way up and out; the legislature declined to adopt his proposals. In 1854, lawmakers transferred the latent examination authority to the state banking superintendent, the official charged with overseeing New York's free banking system. Throughout the 1850s, state banking officials remained dissatisfied with the scope of their authority, while bankers found new ways to avoid the limited powers officials did have.

By December 1858, Superintendent James M. Cook had had enough. Cook, a Whig-turned-Republican, served as a state senator, comptroller and nearly secured the Republican nomination for governor. He picked up Fillmore's critiques and carried them forward. The power to examine on suspicion of wrongdoing or insolvency, he argued, created the false impression that the superintendent had the capacity to determine when reports were fraudulent, or to somehow detect bank insolvency through the reports bankers filed themselves. "Figures and affidavits are never made by bank officers to expose insolvency or defalcations. They, the figures, are most useful adjuncts to conceal the real condition of affairs."

Worse, Cook found that bankers—subject to the damning scrutiny of examination—further avoided even weak public oversight by throwing themselves upon the mercy of friendly courts. In his one attempt to exercise his examination authority, Cook complained, "by the time his agent had obtained a slight insight into the real condition of the affairs of the bank, he was politely met by its receiver, appointed by the court at the solicitation of the officers themselves and told that his duties were ended, and that the property and effects of the bank were beyond his control and power, even for examination." Once in the hands of a court-appointed receiver, the bank was no longer subject to administrative oversight.

The law, Cook complained, gave a public imprimatur to private lies that the superintendent was powerless to root out. The implicit promise that the superintendent could investigate created "an ostensible responsibility" for verifying the truth of bankers' statements "which it is utterly impossible...to fulfill." Instead of following Fillmore's call for permanent public

Metropolitan Museum of Art

Portrait of James M. Cook, superintendent of the New York State Banking Department, from 1856 to 1861.

examination authority, Cook pursued what he called a "radical" path, seeking to push oversight fully onto the private sector. Examination on suspicion, Cook argued, was "a delusion and...purely a cheat of the people." Better to strip away the fantasy that public power could protect private interests and let the people look after themselves.

"When banking capital in this State… finds itself in danger of loss, (and the loss under the law falling alone upon depositors and stockholders,) it, through its managers, entrenches itself in a position... which looks to ultimate solvency instead of large profits," Cook opined. "The great and controlling law of self-interest, once learned through the rough road of experience, is a far more effectual rule of human action than any statutory provision, however strictly enforced." The private interest would always trump the public power.

Cook's program, like Fillmore's, went nowhere. Both men imagined supervision could be something much different and much better. The debate about whether that something should be public or private would rage for another 75 years. With the Civil War and Congress's creation of the national banking system in 1863, it became a national debate, one centered on the US Comptroller of the Currency, and later the Federal Reserve, the Federal Deposit Insurance Corporation and the Reconstruction Finance Corporation. Indeed, only during the New Deal—by which time Fillmore's contribution to the debate was already long forgotten—was the question of how responsibility for financial risk management should be allocated among private bankers and public officials settled firmly in favor of the public.

Whether it will remain settled remains to be seen. $

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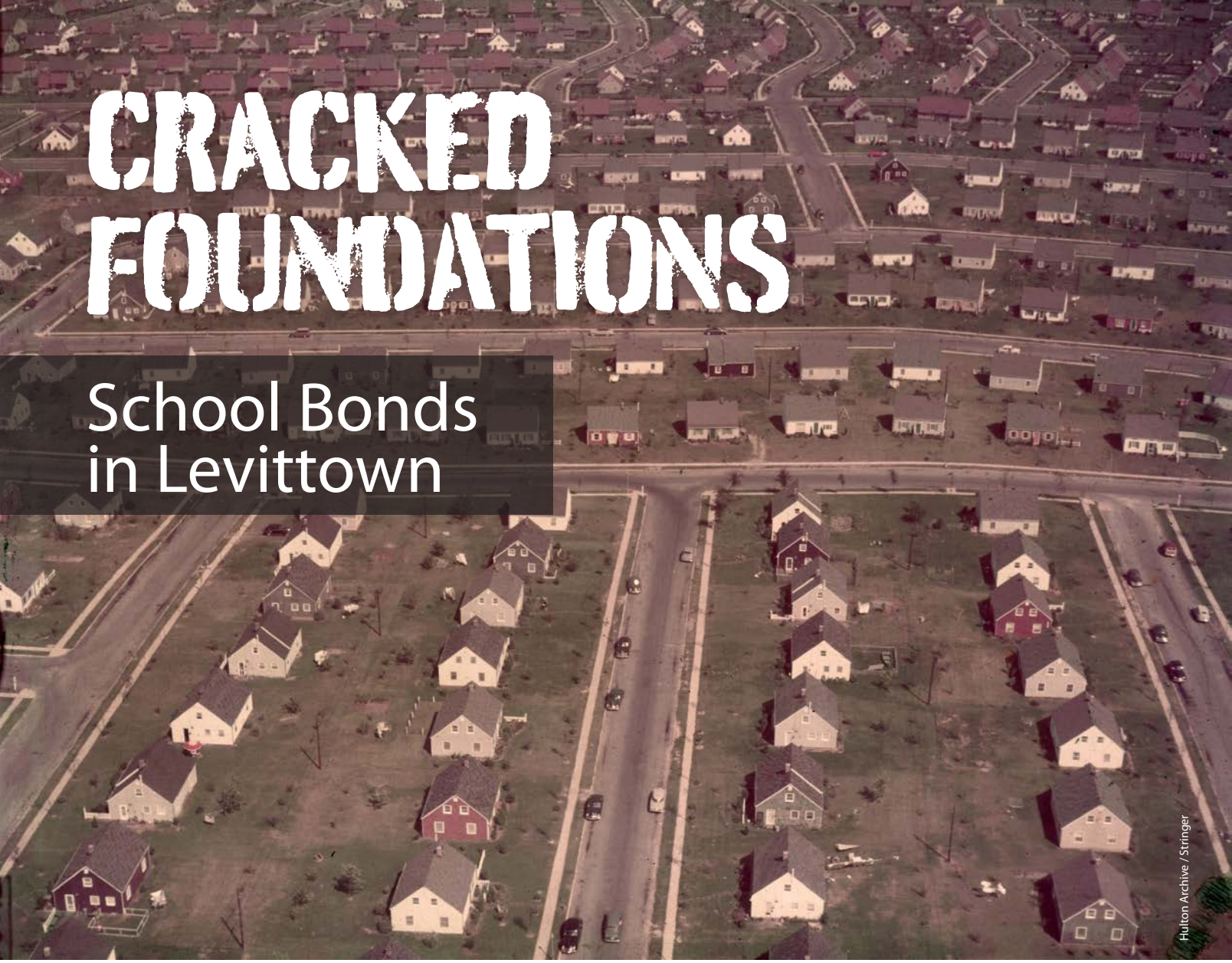
CRACKED FOUNDATIONS

School Bonds in Levittown



An aerial view of track housing in the suburban development of Levittown, New York, 1950s.

By Michael R. Glass

Sometime in the spring of 1947, residents of the school district that would become Levittown received unwelcome news. At the time, the district had just one schoolhouse. A total of 38 students shared two classrooms: one for kindergarten through fourth grade, the other for grades five through eight. According to school board minutes, the discussion at a May 1947 meeting "drifted out of control." Renowned homebuilders Levitt & Sons had been purchasing former potato farms, upon which they planned to erect thousands of new houses. At the meeting, debate centered on how to "cut off" the development, since each house would surely bring more children and higher property taxes. One attendee said that "the farmers should get together and protest," but no one seconded the motion.

Instead, the discussion quickly shifted to managing the influx. An adviser from the New York State Education Department told the school board members that the most important question was "What to do now?" and then "What to do in '48 and '49 and the following years upon years?" At the next meeting, the board approved a municipal bond "for the purpose of providing for excess pupils."

Levittown, New York, is perhaps the most iconic suburb in American history. Between 1947 and 1951, Levitt & Sons constructed 17,447 single-family houses in central Nassau County, just east of New York City. Thanks to insurance from the Federal Housing Administration and the Veterans Administration, a World War II veteran could acquire one of the Cape Cods for no money down and a $58 monthly mortgage payment. Levittown is also notorious for its racial exclusions. As Black veterans discovered, the deeds included a clause prohibiting occupancy "by any person other than the Caucasian race." Even after the Supreme Court struck down racially restrictive covenants, federal officials still approved insurance for the entire development. In suburbs like Levittown, the federal government both made homeownership more affordable and enshrined segregation.

Often overlooked is how postwar suburbanization transformed public education.

New housing developments, coupled with the baby boom of elevated birth rates, produced soaring school enrollments. By 1960, fully 39% of the population in Nassau County was under 18 years old, for a total of 524,976 children. There were more children in Nassau County than total residents in Cincinnati, Denver or Atlanta. In the fastest-growing districts, the sheer number of babies became a running joke. Critics nicknamed Levittown "Fertile Acres," calling childbearing its "major industry." Residents referred to pregnancy as "the Levittown look."

For school districts, the bumper crop of children was no laughing matter. To build schools, districts relied on the municipal bond market. With rising enrollments, no federal aid for school construction and minimal support from the state government, local officials had little choice but to borrow from Wall Street. Municipal bonds allowed districts to spread costs over decades, rather than make one massive appropriation from property taxes. Despite these advantages, debt ultimately made school construction more expensive than it would have been with direct grants from the state or federal governments. School bonds conscripted taxpayers into paying fees to bankers and attorneys, as well as tax-exempt interest payments to investors. For a typical 30-year bond, fees and interest added between 30% and 60% to the total costs, depending on the exact interest rate.

Municipal debt exacerbated inequality in two key ways. First, it produced spatial inequalities. The interest rate that a district paid for its bonds varied based on how investors evaluated its creditworthiness. Even among all-white suburbs on Long Island, creditors sorted municipalities into a hierarchy based on their attractiveness as investments, molding school districts into abstract commodities so that investors could compare them from afar. Through this credit rating process, investors charged poor districts higher rates than wealthy districts. As a result, the disparities between poor and wealthy districts widened with each bond sale.

Second, municipal bonds created inequalities across time. Baseline interest rates fluctuated with broader macroeconomic trends. Whereas the average district could sell its bonds for just 1% or 2% interest during the immediate postwar years, already by the mid-1950s rates had risen to 3% or 4% in response to stricter monetary policy from the Federal Reserve. This increase might seem modest, but at the time the jump from 2% to 4% felt like a doubling of borrowing costs.

Levittown Public Library

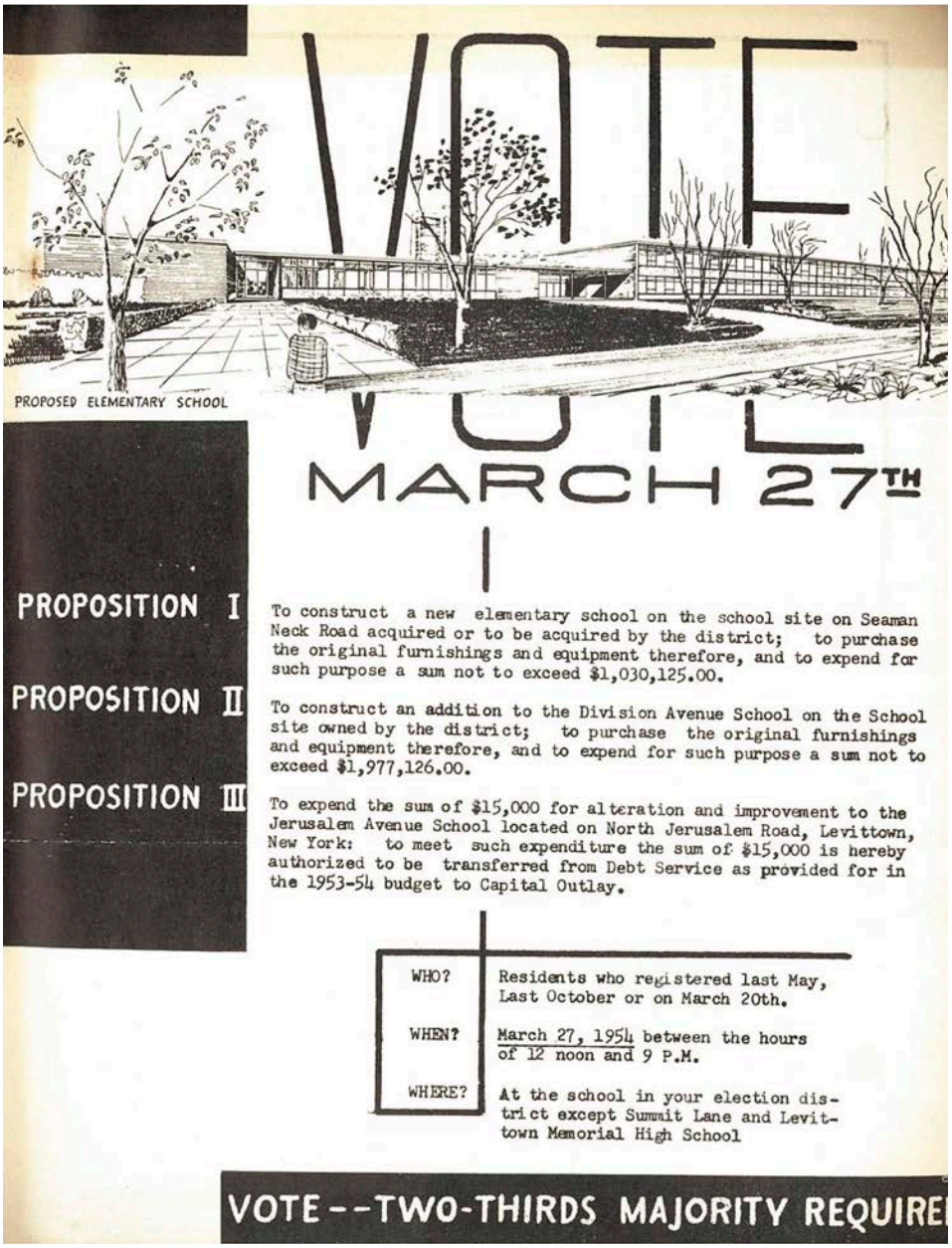
The first new school in Levittown consisted of eight Quonset huts, 1948.

Rapid housing construction in an agricultural region with meager infrastructure created a severe crisis of school overcrowding. All 56 school districts in Nassau County experienced an influx, but the pressure was most severe in Levittown. When the enrollment shot up from 38 students in 1947 to 482 students in 1948, the school board scrambled to locate enough classrooms. In a panic, officials purchased eight surplus Quonset huts and strung the cylindrical sheds together in two long columns to serve as a provisional elementary school.

The Quonset hut school proved just the beginning of the turmoil in Levittown. In 1949, the enrollment doubled to 992 students. Officials moved first graders into the basement of the Levittown Community Church, partitioned the playroom of the Quonset hut into seven classrooms, shipped older students to high schools in neighboring districts and canceled kindergarten altogether. Even with these adjustments, every grade, first through eighth, remained on double sessions for the entire year. In 1950 the enrollment tripled to 3,013 students, and classes overflowed into libraries, cafeterias, gymnasiums and offices.

With enrollments soaring, Levittown officials repeatedly turned to the bond market. In New York, as in most states, a district borrowed funds by issuing general obligation bonds, through which a district pledged all its taxable real estate as collateral for the loans. Before issuing a bond, the state constitution required officials to obtain taxpayer authorization in a bond election. In these campaigns, a common tactic was to disseminate blueprints, the idea being to help voters envision what their property taxes would produce. In one such pamphlet, the Levittown School Board inscribed a promise alongside the drawings: "These buildings will help prevent the overcrowded classrooms and/or multiple sessions that would otherwise result." The assurance resonated with harried parents. Between 1948 and 1957, Levittown voters approved 11 bonds to finance 15 new schools.

After securing taxpayer authorization, districts obtained the funds by floating the issue on the bond market. Districts sold their bonds through competitive bidding, a process that required attracting the attention of investors. Whereas large cities employed entire departments to manage their bond sales, school districts outsourced these tasks to consultants. As part-time volunteers, school board members had neither the time nor the technical expertise for debt administration. In exchange for fees, the consultants handled all the logistics, from drafting contracts to printing advertisements in the financial


VOTE
PROPOSED ELEMENTARY SCHOOL
MARCH 27TH
PROPOSITION I
PROPOSITION II
PROPOSITION III
To construct a new elementary school on the school site on Seaman Neck Road acquired or to be acquired by the district; to purchase the original furnishings and equipment therefore, and to expend for such purpose a sum not to exceed $1,030,125.00.
To construct an addition to the Division Avenue School on the School site owned by the district; to purchase the original furnishings and equipment therefore, and to expend for such purpose a sum not to exceed $1,977,126.00.
To expend the sum of $15,000 for alteration and improvement to the Jerusalem Avenue School located on North Jerusalem Road, Levittown, New York: to meet such expenditure the sum of $15,000 is hereby authorized to be transferred from Debt Service as provided for in the 1953-54 budget to Capital Outlay.
WHO?
Residents who registered last May, Last October or on March 20th.
WHEN?
March 27, 1954 between the hours of 12 noon and 9 P.M.
WHERE?
At the school in your election district except Summit Lane and Levittown Memorial High School
VOTE--TWO-THIRDS MAJORITY REQUIRE

Stony Brook University

Levittown Board of Education pamphlet announcing a school bond election, 1954.

press. Most importantly, the consultants prepared a prospectus for the district—often called an "Official Statement"—and circulated it to potential investors.

Filled with numbers and tables, these documents offered a snapshot of a district's fiscal condition: its property wealth, enrollment trends and debt levels. They also contained elements of narrative, especially in attempts to project a prosperous future. For example, Levittown contracted with the Governmental Statistical Corporation for its bond issues. In an Official Statement, the consultants described Levittown as "a suburban residential area with growing commercial enterprises." They highlighted that "virtually every house in the community has been financed through Federal Housing Administration insured mortgages." In the event of defaults, the FHA would step in to cover the property taxes. Levittown bonds were secure, the consultants told investors, because the federal government stood behind every mortgage.

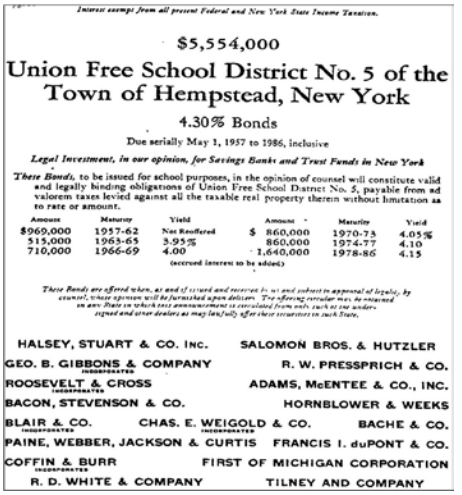
On the other side of the transaction, investors relied on credit rating firms to gauge bond issues. In assigning letter grades to local governments, Robert C. Riehle, vice president of Moody's Investors Services, said that his company "assesses a community's prospects in comparison with neighboring communities." The bond dealers and investment banks that peddled municipal bonds needed to differentiate between tens of thousands of local governments, and letter grades allowed for quick comparisons. Despite the high stakes, Moody's employed only 12 analysts to evaluate municipal bonds nationwide. By necessity, the analysts made judgments from afar using abstract metrics. Riehle said that Moody's primarily based its ratings on "ratios and other statistical comparisons" from financial data. For Moody's analysts and, by extension, the investors who relied on their ratings, school districts were just numbers on a spreadsheet.

It is remarkable how unpersuasive creditors found the depiction of Levittown as a suburban idyll. When Levittown floated a $1.17 million bond in May 1949, Moody's flagged the district as hazardous. Noting that it had "grown by leaps and bounds in the last few years," the analysts called it an "unseasoned residential area" with "an element of insecurity." When the analysts looked at charts of soaring enrollment and low housing prices, they foresaw danger. Moody's thus stamped Levittown with a rating of Baa, or "lower-medium grade." This shaky rating translated into above-average interest costs. Levittown sold the issue to bond dealer Roosevelt & Cross for a bid of 2.7% interest. This rate added $358,000 in interest payments to the $1.17 million issue, increasing the total costs by 31% over the 20-year life of the bond.

Levittown's blemished reputation contrasted sharply with the fate of wealthier districts. Great Neck floated a $2.47 million bond the day before Levittown in May 1949, making for an ideal comparison. An older elite suburb, Great Neck was four times wealthier than Levittown, a difference Moody's analysts recognized in their charts. Great Neck's enrollment was also soaring, but the analysts judged a higher debt load "within the paying capacity of this upper middle class community." "The area was well developed some years ago," they continued, "and although it has experienced some added growth recently, it has no pressing problems." Moody's thus rated Great Neck one notch higher at A, or "higher medium grade." The Levittown and Great Neck credit reports appeared

Levittown Public Library

Construction of Division Avenue High School in Levittown, 1949.



Interest exempt from all present Federal and New York State Income Taxation.

$5,554,000

Union Free School District No. 5 of the Town of Hempstead, New York

4.30% Bonds

Due serially May 1, 1957 to 1986, inclusive

Legal Investment, in our opinion, for Savings Banks and Trust Funds in New York

These Bonds, to be issued for school purposes, in the opinion of counsel will constitute valid and legally binding obligations of Union Free School District No. 5, payable from ad valorem taxes levied against all the taxable real property therein without limitation as to rate or amount.

Amount	Maturity	Yield	Amount	Maturity	Yield
$960,000	1957-62	Not Reoffered	$ 860,000	1970-73	4.05%
515,000	1963-65	3.95%	860,000	1974-77	4.10
710,000	1966-69	4.00	1,640,000	1978-86	4.15

(accrued interest to be added)

These Bonds are offered when, as and if issued and received by us and subject to approval of legality by counsel, whose opinion will be furnished upon delivery. The offering circular may be obtained in any State in which this announcement is circulated from only such of the undersigned and other dealers as may lawfully offer these securities in such State.

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The Wall Street Journal

Advertisement for Levittown school bond, 1956.

on the same page of the Moody's catalog, allowing investors to compare them like merchandise in a store window.

A syndicate of six investment banks purchased the Great Neck bonds for 2.3% interest. In other words, Levittown paid a premium of 40 basis points (or hundredths of a percent)—2.7% compared to 2.3% in Great Neck—for the perceived riskiness of its bonds. The difference might seem marginal, but these disparities would compound over time. Districts that received higher rates would pay more in debt service; higher repayment costs would in turn diminish their credit rating, leading to even higher rates in future issues. Debt finance rewarded the strong and punished the weak, amplifying the initial wealth disparities over time.

Overall interest rates also crept upwards during the 1950s. In an effort to contain rising inflation, the Federal Reserve raised its federal funds rate from 1.07% in 1954 to 2.95% in 1956. These rates established a floor for lending throughout the economy, and the hike accordingly raised bond rates. Over that period, the median school bond interest rate marched upward in lockstep with the federal funds rate, jumping from 2.13% to 3.12%.

Levittown encapsulated the fallout from higher rates. In 1956, the district floated a $5.55 million bond to finance a new high school and three elementary schools. In their credit report, Moody's analysts noted that Levittown's debt load had become "so heavy…as to suggest a hazardous investment environment." The winning bid, from a syndicate of 17 banks, was for jaw-dropping 4.3% interest. This rate added $3.61 million in interest payments to the $5.55 million issue, increasing the total costs by a whopping 65% over the 30-year term. Back in 1952, Levittown sold a smaller issue for 2.7%. If the 1956 issue had sold for the 1952 rate, it would have saved the district $1.38 million in interest costs—enough, officials calculated, to build an entire elementary school. Instead, those funds would be diverted to bondholders.

Despite all the new construction, overcrowding remained severe in Levittown. Over 15 years, the district built 11 elementary schools, two junior highs and three high schools, which together enlarged its bonded debt from zero in 1947 to $22 million in 1961. Nonetheless, the double sessions persisted for those entire 15 years because the enrollment kept outpacing classroom space. The district simply could not build new schools fast enough.

By disrupting daily routines, double sessions impinged on entire households. Half-day shifts made for weary students and overworked teachers, but mothers arguably shouldered the greatest burdens. Half-day schedules required mothers to shuttle kids to and from school incessantly, prepare meals at odd times and manage childcare during the time without classes. One civic group protested: "Home life revolves around numberless meals and snacks at all times." As a result, "Mother… has become a harassed short-order cook." *The Levittown Press* lampooned the routine with a cartoon showing a mother collapsed in exhaustion after multiple drop-offs, pick-ups and snacks. The caption read: "POOR MAMA! She's suffering from a very bad case of split-sessionitis."

Suburbanites thus found their children squeezed into makeshift classrooms and divided into half-day shifts. With no direct aid from Washington, districts grew increasingly dependent on Wall Street. By attaching onerous fees and interest payments, municipal debt made school construction more expensive. It also subjected governments to credit rating, which allowed investors to compare districts from afar like pieces of merchandise. Investors charged higher rates for poor districts like Levittown than for wealthy districts like Great Neck, and the disparities between such places widened with each bond sale. Meanwhile, the credit crunch increased interest rates for all borrowers. In managing the pressures of school construction, local officials struggled to balance the dictates of creditors with the threat of a taxpayer revolt.$

Michael R. Glass is an assistant professor of history at Boston College. He is the author of Cracked Foundations: Debt and Inequality in Suburban America *(University of Pennsylvania Press, 2025), from which this article has been adapted.*

Offshore Drilling in the Gulf of Mexico

By Michael A. Martorelli

The Bureau of Ocean Energy Management's (BOEM) oil and gas lease sale Number 262 in December 2025 will be the latest chapter in the long history of the energy industry's pursuit of offshore oil. It was not until 1962 that the federal government fully realized the revenue potential associated with leasing drilling rights to offshore tracts. That was also the year oil producers finally developed the technology to operate in several hundred feet of water. The industry's story from its earliest days to that watershed era features an unusual mix of science, technology and politics.

From Modest Beginnings to the Eve of a New Era

From 1859 to the end of the 19th century, the country's fledgling oil companies extracted more than 3.3 million barrels of crude from hundreds of wells scattered throughout eight states. As early as 1883, geologists began suspecting that even more oil was trapped in pools under the country's shorelines, a notion the California State Mining Bureau endorsed in 1896. That year, an entrepreneur named Henry L. Williams started a new tradition by building a pier 300 feet out into the Pacific Ocean off the coast of Santa Barbara and drilling for oil in about 30 feet of water. Within a few years, other explorers had drilled dozens of oil wells in that area. That modest oil field never produced more than 75 barrels a day and was played-out by 1902.

Around that time, the companies that discovered the Spindletop and Jennings oil fields in the coastal areas of Beaumont, Texas and Acadia Parish, Louisiana, respectively, speculated that similar oil reservoirs also ranged some distance offshore. By 1919, geologists saw evidence of an extensive oil pool about 2,000 feet out into the Gulf of Mexico. Texas and Louisiana established procedures for companies willing to spend significant amounts of money for the right to explore for oil beneath their coastlines. But the cost of trying to access that offshore oil was prohibitive; moreover, the drillers didn't have the right equipment to do the job.

During the next several years, many companies contributed to the steady improvement in the techniques and processes needed to access the pools of oil they suspected of lying under the shoreline. Geologists advanced the science of underwater geophysical seismology. Contractors built pile-supported drilling platforms and submersible drilling barges. Marine companies converted shallow-draft barges and skiffs to haul equipment and personnel towards the open Gulf waters. And meteorologists improved their ability to understand and predict the nature of tidal movements and storms.

Actual drilling activities proceeded slowly. In 1927, geological and geophysical survey parties discovered an underwater salt dome and affiliated oil reservoir offshore Louisiana in Vermilion Bay. During the next two years, additional crews discovered similar geologic patterns south of Houma, Louisiana, as well as potential oil reservoirs as far as a mile out under the Galveston Bay. By 1935, companies were drilling hundreds of wells off the coasts of

The ENSCO 8506 offshore semisubmersible drilling rig in the Port of Galveston, Texas, in the Gulf of Mexico, April 7, 2019.

Texas and Louisiana. Underwater offshore reservoirs yielded large amounts of oil. These results spurred the conduct of geophysical surveys further out in the Gulf.

In 1938, Pure Oil and Superior Oil built the first freestanding drilling platform near Creole, Louisiana. That platform was more than a mile offshore and stood 15 feet above the waterline; its drill bit went through 14 feet of water. The Creole field yielded almost four million barrels of oil. During the next few years, many other companies drilled productive wells in the Gulf; some were located up to 10 miles offshore. The coming of World War II, and more specifically the threat of German U-boats prowling along the Gulf Coast, brought most of this activity to a halt.

In mid-1944, the absence of the U-boat menace spurred oil companies to resume their offshore drilling activities. The rapid return to extensive automobile driving after V.J. Day in August 1945 caused an unexpected shortage of gasoline, making the development of new sources of oil an important post-war initiative. Companies returning to the Gulf used wartime technologies such as sonar and seismic sounding; they hired experienced Navy divers for underwater operations; and they converted war-surplus landing crafts to drilling tenders, supply boats and pipe-laying ships.

The price of crude oil rose from its wartime frozen level of $0.92 per barrel to $1.27 in mid-1946 and $2.32 by the end of 1947, thus encouraging even relatively small companies to explore the deeper waters of the Gulf. In 1946, Magnolia Petroleum Company explored a parcel about 10 miles out to sea, positioning a drilling derrick about 12 feet over the water line. After spending more than $1 million on the first of its three planned wells, the company found natural gas pockets at 900 feet and 1,500 feet, but no oil.

In 1947, Kerr-McGee, in partnership with Philips Petroleum and the Stanolind unit of Standard Oil of Indiana, located attractive salt domes more than 10 miles offshore. It paid Louisiana $317,000 for the right to drill two 20,000-acre tracts that appeared promising in seismic surveys. An engineer modified Magnolia's derrick design and hired Brown and Root to build a new type of freestanding platform. Kerr-McGee made history by using a platform it labeled Kermac No. 16 to drill wells in "only" 18 feet of water but more than 10 miles offshore, i.e., "beyond the sight of land."

Southern Methodist University, Central University Libraries, DeGolyer Library

Continental Oil Co. offshore oil well drilling platform in the Gulf of Mexico, March 23, 1955.

The successes of the companies noted above encouraged others to increase their activities in the gradually sloping waters extending from 50 to 140 miles from the shoreline. In the last few years of the 1940s, almost three dozen companies spent more than $200 million to discover 11 separate oil fields with a total output of 16,500 barrels a day. But that early opening to a new era of offshore oil exploration was cut short by a ruling from America's highest court.

The Dispute Over Federal vs. State Control

The coastal states had long believed they controlled the submerged lands reaching at least three miles from their shores. Based on that understanding, they had a history of regulating fishing rights, constructing appropriate infrastructure facilities and leasing offshore tracts to companies exploring for oil and gas. As far back as 1937, the federal government had asserted its own right to control leasing rights to the tideland waters off the country's coastline. Acting upon the suggestion of Secretary of the Interior Harold L. Ickes, Congressman Gerald P. Nye (R-ND) encouraged Congress to proclaim national dominance over those waters. Doing so seemed to be a natural extension of the Roosevelt administration's program to establish more control over American industry, especially the energy sector. It was also a reflection of federal efforts to conserve the nation's petroleum resources. But the government took no action to confirm or enforce its offshore ownership rights at that time.

In October 1945, President Harry Truman signed Executive Order 9633, which proclaimed that the resources under the subsoil and seabed of the continental shelf were subject to the control and jurisdiction of the federal government. California argued that its 1849 constitution included in its boundaries the waters extending three miles from its shore. Attorney General Tom Clark sued the state to challenge that claim. In June 1947, the Supreme Court ruled in the landmark *United States v. California* case that the federal government, not the states, owned the submerged lands off the coasts. Therefore, it had "full dominion over the resources of the soil under that water area, including oil."

The government pursued similar lawsuits against Texas and Louisiana—states that also claimed their original constitutions gave them the right to control their offshore waters. All three states immediately ceased further leasing activities while those two cases made their way through the federal court system. In June 1950, the Supreme Court validated the federal government's right to control the waters off those states' coasts. The ruling allowed existing drilling projects to continue on the five million acres Louisiana and Texas had already auctioned to the oil industry, but it prohibited those states from issuing new permits for exploration.

During the next two years, oil companies and states' rights advocates twice persuaded Congress to pass a law returning to the states at least partial rights to control their submerged coastal lands. President Truman vetoed both bills, asserting that it was not right to give certain states the "free gift" of valuable land and mineral rights that belonged to all the states in the Union. His veto message acknowledged that companies had already extracted 235 million barrels of oil from the coasts of California, Louisiana and Texas, and that they had identified another 278 million barrels of proven reserves. It even suggested that more than 2.5 *billion* barrels might still exist in those territories.

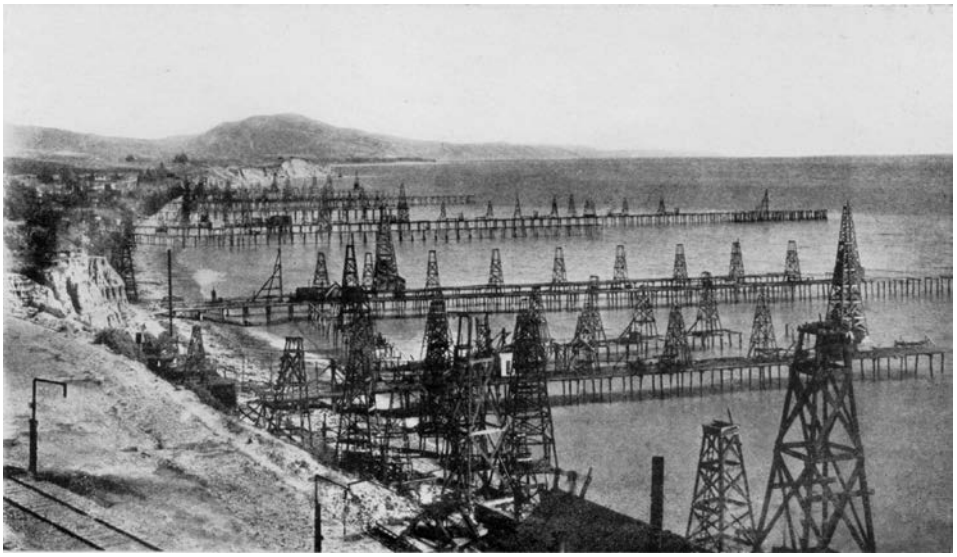
In May 1953, President Dwight D. Eisenhower delivered on his campaign promise to break the deadlock over what was called the Tidelands Oil controversy by signing the Submerged Lands Act (SLA). That law recognized the states' rights to control the use of the lands

beneath their navigable waters out to three nautical miles from their shores. But it left it to the courts to determine whether any state could establish an historical claim to waters beyond that three-mile limit. Just three months later, the President attempted to clarify that issue by signing the Outer Continental Shelf Lands Act (OCSLA). It gave the federal government jurisdiction over submerged lands on the continental shelf more than three miles from the various states' shorelines. It also ordered the Department of the Interior (DOI) to create a federal offshore leasing program. The practical result of both laws was to formally recognize a federal role in the development of offshore mineral resources. But disputes over the extent of that role persisted.

The DOI's Bureau of Land Management (BLM) and the US Geological Survey's (USGS) Conservation Division prepared maps of the tracts of offshore land that would be available for leasing; they also developed procedures for conducting competitive, sealed-bid auctions for the rights to develop those tracts. The results of the BLM's first three federal lease sales were quite lucrative.

- In October 1954, companies paid $129.5 million for the rights to develop tracts covering 417,000 acres off the coast of Louisiana; most of the acreage was well beyond 10 miles; some tracts were as far out as 50 miles.
- In November 1954, companies paid $23.4 million to explore 19 tracts—all more than 10 miles off the coast of Texas.
- In July 1955, companies paid another $108.4 million to explore 121 tracts off Louisiana and Texas.

But in the meantime, Louisiana and Texas continued to insist that their control over the tidelands should extend out to three *leagues* (about 10 nautical miles) from their shorelines. In August 1954, the Louisiana legislature had re-asserted the rights to not only its 10-mile boundary, but also territory extending another 27 miles beyond that point. Then in May 1955, the state auctioned leases for nine offshore tracts beyond the federally recognized three-mile limit. The Supreme Court stepped in to enjoin both Louisiana and the BLM from conducting any further auctions of offshore tracts until either 1) the boundary dispute was finally adjudicated or 2) all parties figured out how to work together, even while that dispute made its way through the court system.



Courtesy of the National Oceanic & Atmospheric Administration

Many of the earliest offshore oil wells were drilled from piers at Summerland in Santa Barbara County, California. Photograph by G.H. Eldridge, circa 1901.

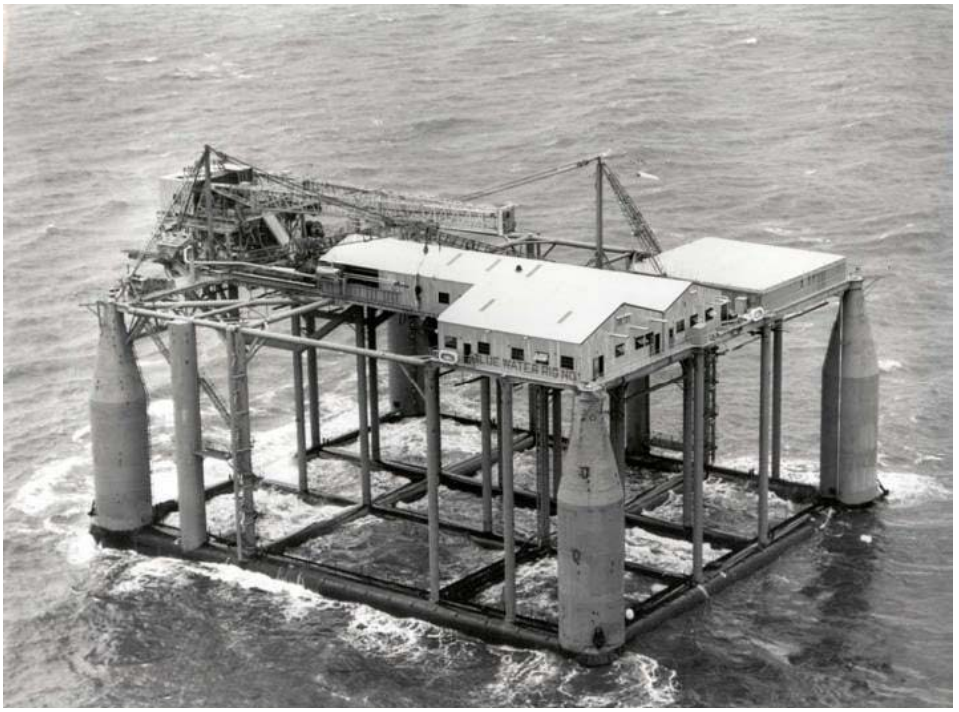
Everyone was highly incentivized to reach an agreement. Throughout the period 1954 to 1956, oil and gas companies had been actively exploring the leases they won under both state and federal leasing programs. Large exploration and development firms such as Gulf, Humble and Shell developed successful partnerships with contractors such as Glassrock Drilling, Zapata and ODECO, thus gaining access to those firms' innovative mobile drilling equipment, such as submersibles and "jack-up" rigs. Those new rigs, as well as some converted offshore barges called drillships, were capable of operating in water up to 70 feet deep. The industry enjoyed an unusually high drilling success rate and discovered more than 160 separate and lucrative fields that were producing more than 200,000 barrels per day.

In October 1956, all parties agreed to what they labeled an "Interim Agreement." It created offshore Zones 1 through 4, ranging from the immediate shoreline to the limit of the outer continental shelf. Zone 1 would extend out to three miles and clearly be under the jurisdiction of the individual states. Zone 2 would be in the disputed territory ranging from the three-mile line to the three-league line. Zone 3 would extend from that point out about 25 more miles to Louisiana's purported extended state boundary. Zone 4 would extend from that point to the limit of the continental shelf and clearly be under the jurisdiction of the federal government. The revenue from leases, rentals and royalties in Zones 2 and 3 would be held in escrow and divided among the federal and state governments when all boundary questions were settled.

Moving to the Future

The next two years were challenging. In November 1956, fighting erupted over Egypt's attempt to nationalize the Suez Canal, an important waterway for shipments of oil from the Middle East. Closing that waterway caused worldwide oil prices to surge and led to a period of expanded drilling activity in the Gulf of Mexico. When the Suez reopened just six months later, oil prices declined to their former level. The large supplies of crude resulting from the recent Gulf Coast activity hit the market at the same time that a brief (eight months) but serious (GDP declined 3.7%) economic recession hit the United States. During that time, the percentage of drilling rigs that were working dropped from 100% to 37%.

The economy and the offshore industry recovered quickly. In May 1959, the BLM generated lease sale revenue of $90 million. Later that year, the state of Louisiana



Courtesy of Friede & Goldman, LTD

In January 1962, Shell drilled a record-setting offshore well in 297 feet of water in the Gulf of Mexico with the Bluewater Rig No. 1, the industry's first semisubmersible drilling rig.

generated $141 million from leasing tracts in Zone 1. It was still awaiting the ultimate Supreme Court ruling on its rights to tracts beyond that point. In February 1960, officials from Shell Oil encouraged the BLM to include in its latest auction more tracts up to 25 miles offshore and in water up to 300 feet deep. They did so knowing their company was developing a revolutionary semisubmersible drilling vessel capable of drilling in such previously unexplored depths. The BLM added such tracts. Shell was a major winner, contributing much of the $285 million in revenue that the auction generated. That figure was more than twice as much as the amount earned in any previous lease sale. The BLM rejected additional bids by Shell for tracts in Zone 4. It considered those bids to be artificially low; and besides, they were uncompetitive since no other company had felt competent to bid on those tracts.

In May 1960, the Supreme Court ruled that Louisiana could control leasing activities only up to the three-mile limit. With the extent of its control now firmly established, the BLM decided to begin offering many more leases in Zones 3 and 4 and in water more than 100 feet deep. Officials were aware that many companies were adopting new seismic exploration techniques and developing drilling rigs capable of operating farther out into the Gulf. Indeed, in January 1962, they watched Shell Oil begin operating a ground-breaking floating drilling platform the company named Bluewater I. It began drilling in a tract the company had won in 1960 and that was in the previously unheard-of depth of 297 feet of water. One of the engineers who developed it referred to its similarity to an iceberg and coined the term semisubmersible to label it.

Between 1960 and 1962, the BLM increased its knowledge about the nature of the waters in the Gulf. Officials developed new analytical methods to determine minimum bid possibilities for tracts much farther from land and in much deeper water than before. In March 1962, the BLM held a two-day lease sale that marked the beginning of a new era of exploration. The two-day sale generated $445 million, a sum that exceeded the combined annual revenue from all timber sales in Oregon and California and all onshore mineral leases. It represented a landmark in history for several reasons:

- It opened the deeper waters of the Gulf to a broad range of participants, including new combinations of large integrated companies and smaller independent ones.
- It was the first time bidders used rigorous quantitative studies of the size of the tracts to guide their bids to deliver appropriate risk-adjusted required rates of return.
- It opened the eyes of federal regulators about the revenue potential inherent in the activities of the thinly staffed BLM.

And in one feature not fully appreciated at that time, the 1962 BLM sale ushered in a new era of cooperation among companies exploring for offshore oil. That activity in turn brought about the accelerated diffusion of drilling and production technology. In one particularly unusual example of that process, Shell Oil charged seven competitors and the US Geological Service $100,000 each to attend a three-week school in which it shared its knowledge about deepwater drilling. Thus, at the same time one group of technology companies and adventurers began exploring outer space, another group of oil companies and construction firms took the still risky business of offshore drilling to new levels of efficiency. $

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The Real El Dorado

How Corn Became Pervasive in the US Economy

Nebraska State Historical Society

By Gregory DL Morris

The common breakfast of sausage, egg and cheese rolled in a tortilla is actually corn with corn with corn with corn. Most likely the vehicle that transported the eater to the café or grocery store for that meal was fuelled in part by corn.

Production of corn in the United States was projected to be 16.81 billion bushels in 2025. At the October price of $4.22 a bushel, that's about $70 billion. In contrast, US production of gold is worth about $12 billion a year. That makes the yellow grain, not the yellow metal, the true El Dorado.

Compared to corn, the next largest crop, soybeans, is not even close at 4.3 billion bushels expected to be grown in the United States in 2025. Wheat is a distant third at 1.9 billion bushels.

How one crop, *Zea mays*, came to dominate not just US agriculture but large swaths of the entire economy, is due to three main factors: the inherent qualities of the plant, the convergent interests of multiple large industries and the complex politics of agricultural subsidies and tariffs.

The two major end uses for corn in the United States are animal feed and motor fuel. About 40% is used for cattle, hogs and poultry—mostly on factory farms. Another 40% is used to make ethanol that is blended by federal mandate into gasoline. The balance of 20% is other uses, including human food. Most of that is in highly refined ingredients in processed foods and personal-care formulations. The amount of corn that people eat as corn is a vanishingly small fraction of total production.

To be clear, corn on the cob or in the can is a variety called sweet corn. The vast majority of the crop is field corn, which would taste tough and starchy if eaten. And there is the first part of the magic formula. All plants use photosynthesis to turn air and water into sugars and starches. Some, called C4s, are better than others at it. Many C4s are warm-season grasses, including corn, sugar cane, sorghum, millet and switch grass.

"C4s tend to be extremely well adapted to hot, dry climates by using a lot of water to keep cool," said Margaret Smith, professor of plant breeding and genetics in the School of Integrative Plant Science at Cornell University. "They are more efficient at fixing carbon to make carbohydrates." From 2020 to 2025, Smith served as associate dean of the College of Agriculture and Life Sciences at Cornell, and as director of the Cornell Agricultural Experiment Station.

The predecessor of modern corn was first cultivated in Central America about 9,000 years ago. From that time, humans have been cross-breeding various strains to enhance favored traits. Smith explained that virtually all field corn planted commercially today is a type of hybrid called F1 in which each plant in the first generation will be identical, but each plant in the second generation will vary widely.

The advantage is that each stalk will grow at the same rate to the same height and be ready for harvesting at the same time. The disadvantage is that if the grower were to save kernels to plant the next year, those second-generation stalks would all be different heights and would mature at different times. That means growers have to buy seed corn every year. So what used to be a self-sustaining crop became an annuity for seed companies.

An important turning point in the business history of corn came in the early 1930s, during the Great Depression and the Dust Bowl. "That is when subsidies were put in place," said Smith, "and also the same time that breeders came out with the first hybrids. That was a huge change. Farmers had always saved seed to plant the next year. One hybrid planted in Iowa was particularly drought tolerant and had about double the yield, even under poor conditions. In 1935, abut 6% of the corn planted in Iowa was hybrid. By 1938, it was half. By 1940, it was virtually all."

The same thing happened in other states, but less rapidly. Big yields could

Men pumping fuel for cars at the Earl Coryell station in Lincoln, Nebraska, April 11, 1933.

not have come at a better time. Although the United States did not formally enter World War II until late 1941, the country had been shipping rapidly rising volumes of meat and grain for food and feed to the UK from the start of the war in 1939. Those exports continued to grow to feed Allied troops and civilians around the world during the war and in the decades of recovery after.

War was linked to the rise of industrial agriculture in two other historical instances. Both meat and vegetables tended to be local or regional markets from time immemorial. The canning of meat had been pioneered to feed Napoleon's army, but the need for the US government to feed more than two million soldiers and sailors during the Civil War led to the industrialization of meat packing and shipping of food and feed by rail on a scale never before seen.

After the Civil War those meat-packing firms sought new markets in the cities booming with immigrants. That was the era of the cattle drives, as many former soldiers on both sides turned cowboy, rounding up vast herds of cattle gone wild during the conflict.

The other, and arguably the biggest, inflection point in the industrialization of agriculture was the commercial process to fix nitrogen developed in the early years of the 20th century. Before that, all crop production was limited by the nitrogen available in the soil, or added by manure or other natural sources. Crops had to be rotated, or fields left fallow in clover or other nitrogen-fixing plants.

The broad connection to war is that the same nitrogen compounds that are used to make fertilizer can also be used to make explosives. Munitions production for both World War I and World War II turned to fertilizer production after hostilities ceased. The specific connection to corn is that the epic productivity of hybrids can only be sustained by massive inputs of fertilizer and irrigation.

Mechanization also increased in the 1940s . That was first an expedient as many farm workers went off to war, and then a necessity to plant, fertilize and harvest larger crops on more acres.

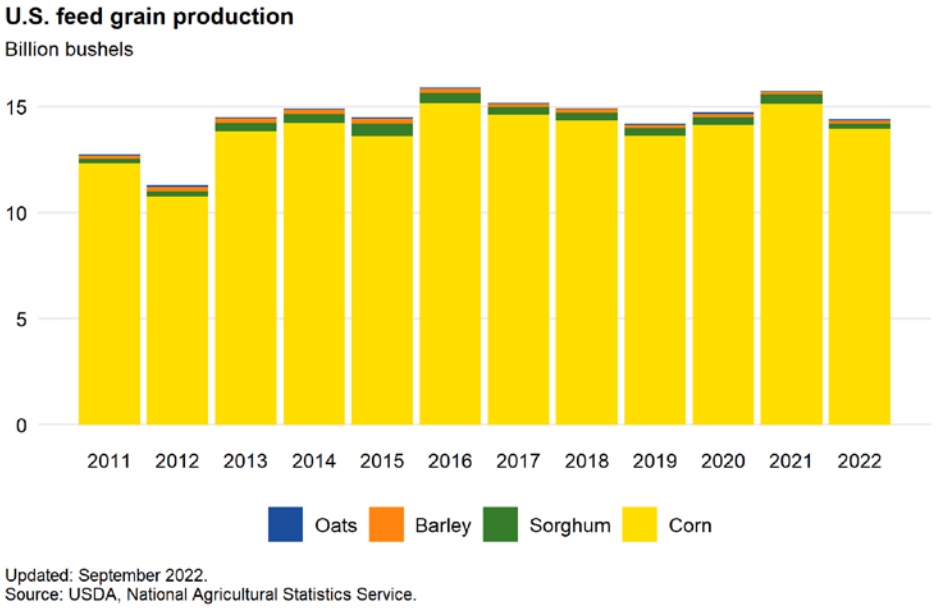
"Hybrids are bred for more of the carbon fixed as carbohydrates to go into the kernel and less into the leaves and stalk," said Smith. "But mostly they are bred to tolerate higher density. Higher yield comes mostly from more plants per acre. It was once standard to have 12,000 to 15,000 plants per acre. Now it's common to have 32,000 or more."

Margaret Smith, professor of plant breeding and genetics in the School of Integrative Plant Science at Cornell University: "Higher yield comes mostly from more plants per acre."

What looks like a corn field is really a starch factory. Corn is uniquely productive, but to achieve that it is uniquely needy.

It is important to note that agricultural subsidies in the United States were originally based on trying to balance price stability to sustain farmers while also keeping food prices reasonable for consumers. That included provisions for stockpiling corn in fecund years for sale in lean years, as well as paying farmers to keep land out of production to try to prevent oversupply.

That all changed in the early 1970s. Earl "Rusty" Butz was Secretary of Agriculture in the Nixon administration. A massive sale of grain to Russia in 1972 was one big factor in rising food prices in the United States. The following year, the Arab oil embargo added to inflationary pressures. Exhorting farmers to plant "fencerow to



Professor Chad E. Hart, professor of economics at Iowa State University: "Corn is an incredibly flexible crop that can be used in so many industries. Which is important, because we get more bushels every year."

Sasha Bakhter, UC Davis

Jeffrey Ross-Ibarra, professor of evolution and ecology in the College of Biological Sciences, University of California at Davis: "If you already have a lot of corn, there is going to be political and social pressure to use that."

fencerow" and "get big or get out," Butz reconfigured subsidies to encourage maximum yield.

In traditional economics, low prices drive a decrease in production, just as high prices support increased production. But that paradigm is turned on its head for corn. With the financial mandate for farmers to produce ever-increasing volumes, corn completed its shift from an agricultural commodity to an industrial raw material.

"When prices drop, farmers just say, 'I'll make it up in production,'" according to Smith. "There is some price responsiveness, but subsidies do skew that. The subsidies are a very political issue, so there tend not to be major revisions, and there is only a Farm Bill every five years. Unless there is just a continuing resolution."

It might seem that the oil shocks of the early 1970s should have given rise to the fuel ethanol industry, but high corn prices were a militating factor. Also, the industrial-scale processing capacity and technology were not well advanced.

"Moonshiners have long known how to turn corn into alcohol," said Chad E. Hart, professor of economics at Iowa State University. "Looking back at the '70s that should have resulted in the US looking into expanded domestic oil production plus biofuels. But we got neither."

Thirty years later, much had changed. "By the early 2000s the price of corn was very low, and also we had learned to fine tune the process," said Hart. "There were also more rural legislators looking for potential industrial development in agricultural areas."

The result was the Renewable Fuel Standard (RFS), a federal program that requires transportation fuel sold in the United States to contain a minimum volume of renewable fuels. The RFS originated with the Energy Policy Act of 2005 and was expanded and extended by the Energy Independence and Security Act of 2007.

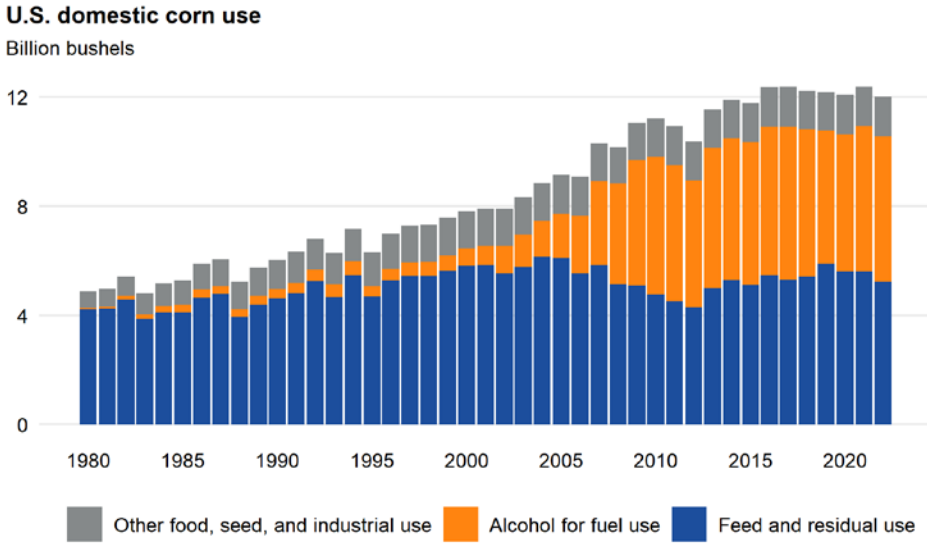
The original mandates did not specify corn, but that quickly became the de facto raw material and has since cemented its primacy. "Corn is ridiculously productive, yielding the most carbohydrates per unit area," said Jeffrey Ross-Ibarra, professor of evolution and ecology in the College of Biological Sciences, University of California at Davis. "Genetically corn has adapted to a wide range of diverse environments. If you already have a lot of corn then there is going to be political and social pressure to use that. It was a political decision that made corn dominant in fuel ethanol."

Fuel ethanol capacity in the United States was 1.2 million barrels a day at the start of 2025, according to the US Energy Information Administration (EIA). For perspective, US oil production for 2025 is projected to be 13.6 million barrels a day, making fuel ethanol about 9% of oil production.

Those figures are strictly for relative scale, because ethanol does not directly displace domestic crude oil in the production of domestic fuels. A significant portion of US crude is exported, while US refineries tend to use imported crudes. That is a significant net import/export gain, because US crudes usually command a premium on global markets while large and complex 'deep conversion' US refineries can make large volumes of high-value fuels, lubricants and petrochemicals from lower-cost imported crudes.

While there is fuel ethanol production in 22 states, including New York, Texas and California, capacity is heavily concentrated in the Midwest: 27% in Iowa, 13% in Nebraska and 10% in Illinois, according to the EIA.

Production capacity might be the only clear factor about corn-based fuel ethanol. One essential and fraught debate is the energy balance. Some research has determined that it is a net energy loss: When the production and transportation for all the fertilizers and herbicides needed to support high-density hybrid corn are factored into the equation, corn-based ethanol takes more energy to make than it



Updated: September 2022.
Source: USDA, National Agricultural Statistics Service.

provides. Other research has determined it breaks even, while some more recent research indicates a slight net positive. But that is a distinction without a difference. Fuel ethanol made from sugar cane is net energy positive by a large margin. Cane-based ethanol is blended at a 30% ratio into gasoline in Brazil.

"Any high-sugar or high-starch crop can be made into ethanol," said Hart at Iowa State. "Sugar cane is the best of the bunch, but the US is well north of the equator. The cane we do grow is worth more as sugar than as fuel. The energy balance for corn-based ethanol has improved, but there is still an argument."

The political, environmental and scientific debates are beyond the scope of this article. The business and financial success of corn as an industry is clear as moonshine.

"When the US got into biofuels, it was not a matter of one use [for corn] making room for a new one," said Hart. "The industry grew to absorb a new end use. Corn is an incredibly flexible crop that can be used in so many industries. Which is important because we get more bushels every year and have to find new uses. It's the Catch 22; we always need new uses." To help find those uses, Iowa State is home to the Center for Crop Utilization.

After the two major industries of feed and fuel, human food is the end use market for most of the rest of the corn crop. One of the most valuable products is also one of the few that is commonly known, even notorious: high-fructose corn syrup (HFCS).

The turning point in the business history of HFCS is similar to other segments of the corn industry. The lab-scale processes to turn starch into sugar have been known for ages. Modest commercial-scale chemical operations date to the mid-1800s. A process using enzymes was first developed in the 1940s and commercialized in the 1960s. That is why HFCS was suddenly in practically everything on the supermarket shelf starting in the 1970s.

The same subsidies that keep corn prices low to underpin the meat and fuel segments also underpin the processed-foods segment. In the latter, there is the added effect of tariffs to protect domestic sugar from foreign competition and keep sugar prices high. That has enabled HFCS to take a large market share.

The last major piece of the corn-industrial complex is the most recent: genetic modification to make corn resistant to herbicide, specifically glyphosate, better known as Roundup. Monsanto patented Roundup in 1971. That patent expired in 2000.

The original work on modification was done for soybeans, said Howie Smith, a now-retired research geneticist with Pioneer Hi-Bred Seed Co. (no relation to Margaret Smith at Cornell). "Weeding of soybeans every July and August was manually intensive, and around the mid-'90s there were some pretty good broad-leaf herbicides. Monsanto developed herbicide-resistant soybeans that became extremely popular. After that it was decided to develop herbicide-resistant corn."

With an herbicide-resistant crop, the farmer can simply spray the whole field. That is more efficient for the farmer, but also means a great deal more herbicide will be sold.

Not everyone was enthusiastic. "Pioneer was resistant to using herbicide-resistant corn," said Howie Smith. "People realized some of the things that could happen when you spray 100 million acres with herbicide."

That question has become the most enflamed of all the controversies in the financial history of corn. Glyphosate has been linked to cancer in humans and colony collapse in honeybees. Manufacturers refute the links and have spent billions settling lawsuits. That, too, is beyond the scope of this article.

What can be stated definitively is that the booming corn industry has driven consolidation in the broader chemical and agricultural processing sectors.

For example, in 1999, DuPont bought Pioneer Hi-Bred. In 2017, DuPont Pioneer was combined with Dow Agrosciences as part of the merger of Dow and DuPont. Two years later that combination was spun off as Corteva. That firm controlled about a third of the US corn seed market in 2020, the most recent figures from the US Department of Agriculture. Bayer, which bought Monsanto in 2018, controlled another third.

Downstream, the corn-milling, meat-packing and fuel-ethanol sectors are also oligopolies. Cargill, Inc.—the largest private company in the US over the past four decades—holds the trifecta as one of the largest producers in all three sectors. Archer-Daniels-Midland is among the largest in milling and ethanol.

In meat processing, Tyson Foods holds the triple crown as largest poultry producer and also among the biggest in beef and pork. Shares are traded, but it is effectively controlled by the founding family and institutional investors. Chinese-owned Smithfield is the largest pork processor in the United States. Brazilian-owned JBS is also big in beef and pork. $

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Leonard Jerome, Gentleman Speculator

Winston Churchill's Grandfather was a Fascinating Wall Street Figure

By Daniel C. Munson

In 1860s New York, Leonard Jerome was a captivating character. He was a prominent money manager, and his 25% ownership of *The New York Times* made him influential on important political and economic matters. His sponsorship of the opera and his lavish parties at his mansion and at Delmonico's kept him in the society columns as well. His carriages and his four-in-hand were the most elegant in town.

"He dazzled society," social chronicler Lloyd Morris wrote, with "his fantastic speculations, his scandalous love affairs, his incredible parties." Another such chronicler, Matthew Hale Smith, labeled him "the leader of fashions." He was the founder of the American Jockey Club and built Jerome Park in the Bronx, where the "sport of kings" really got its start in America. He endowed a college prize to the student "who best displayed the characteristics of an American gentleman."

Apart from all this, Leonard Jerome was generous and good-natured and perhaps the most quintessential "knickerbocker" of his day. One of his Wall Street contemporaries said of him and his investing success, perhaps somewhat ruefully, "Sometimes it pays to behave like a gentleman." Today, however, Jerome is remembered, if at all, as Winston Churchill's maternal grandfather—a mere footnote in his grandson's great biography.

Leonard Jerome was born in 1817, one of nine brothers and a sister living on a farm in Palmyra, New York. The Jerome boys were diligent students, and Leonard's

Portrait of Leonard W. Jerome published in *The American Turf*.

older brothers went off to the College of New Jersey (now Princeton University) to further their educations. They weren't wealthy, and it wasn't easy to keep up with the costs. Leonard's older brother Addison quit after a few years and went off to seek his fortune in Wall Street. Leonard had the same problem, but he solved it by leaving Princeton after two years and finishing up at Union College in nearby Schenectady.

Leonard read the law and joined a firm in Albany. The competition for work in the capital city was fierce, and Leonard decided to move west and work in his uncle's law office in Syracuse. The work routine there was more to his liking, so when Uncle Hiram moved to Rochester, Leonard moved with him.

Leonard's brother Lawrence joined him at Uncle Hiram's firm, and the two got along well. The many Jerome brothers do not appear to have been particularly competitive with one another and seemed to regard their siblings as assets and confidants, rather than rivals. They were almost universally remembered as wits, which—when combined with their manners and healthy good looks—made them excellent company. One Rochester hostess remembered the Jerome boys as "always screamingly funny." That natural charm would be a distinguishing feature of Leonard Jerome's entire life.

Leonard married Clara Hall of Rochester in April 1849, and the two embarked on a life of adventures that their community in western New York could scarcely imagine.

Leonard was not a life-long lawyer by temperament, and when the opportunity arose to buy a newspaper in Rochester, the *Daily American*, using some of his fiancée's capital, he and his brother Lawrence jumped at the chance. They allied their newspaper with the Whig cause, and their stewardship of the paper's editorial stance increased circulation dramatically and drew national attention. New York was the most populous state in the Union in the late 1840s, its 36 electoral votes a big prize. So when the Whig candidate for president in 1848, Zachary Taylor, emerged the winner both in New York and nationally, Leonard Jerome stood to benefit.

The Taylor administration offered Leonard the position of consul to Ravenna, an Italian province, and Leonard accepted. Before departing, however, Leonard signed up with the Merchants State Telegraphic Company as secretary-treasurer and took an equity stake. His work there kept him busy arranging telegraph lines across New York State—and too busy to take up a diplomatic post. When Samuel Morse and his Magnetic Telegraph Company sensed a threat to their dominant market position and bought out Merchants State in 1850 for the princely sum of $65,379, Leonard had his first financial success.

Jennie Churchill, with her sons John (left) and Winston (right), 1889.

Decently fixed, Leonard and Clara accepted another consul post, this time to Trieste on the Adriatic, a major seaport of the Austro-Hungarian Empire headquartered in Vienna. The two of them were enchanted with the place. Leonard enjoyed the opera, learned to sail and developed a love of horses, which was piqued by visits to the nearby Lipizzaner training grounds. Clara became mesmerized by the manners and social charm of the aristocratic leaders in Trieste and Vienna, and it became a life-long fascination for her. Leonard enjoyed this titled crowd too, but he also found them hopelessly impractical.

Leonard's success with the Merchants State Telegraphic Company must have sharpened his interest in finance. Clara recalls that on returning to the United States, "Leonard did not wait to unpack before he plunged. Every dollar he didn't settle on me was in constant use on the market." Leonard's brother Addison's Wall Street partnership had declared bankruptcy just before Leonard returned, but this does not appear to have concerned Addison or his brother. The two men set their families down at 8 Amity Street in Brooklyn—near today's Van Voorhees playground and conveniently close to the ferries that would take them to Wall Street—and went to work.

Commerce boomed in the 1850s: railroads, telegraph, gold discoveries. "Of all the decades in our history," English historian G.M. Young concluded in the 1930s, "a wise man would choose the 1850s to be young in." The bullish zeitgeist even got to the normally bearish Karl Marx, who wrote in 1852, "There is no more splendid time to enter the world than the present. Australia and California and the Pacific Ocean! The new world citizens won't be able to comprehend how small our world was."

The Jerome brothers had a good deal of investing success that decade, and they made the most of their failures. Leonard lost a bundle on shares of the Cleveland and Toledo Railroad due to some devious stock issuance, but Leonard made "lemonade from lemons" by publicly championing better control of such issuance, a popular stand to take on behalf of Wall Street's many small investors. The 1850s boom in railroad finance saw Leonard at the forefront. His connections with newspaper editors and the lavish lunches he hosted may have been responsible for the placement of stories that could be expected to influence certain stock prices.

Library of Congress

Hand-colored lithograph print titled "The False Start," showing Jerome Park in the West Bronx, 1868.

Leonard Jerome appears to have been a supremely self-confident "plunger." Biographer Anita Leslie claimed, "He used to paralyze his friends by the magnitude of his transactions." Yet he also appears to have been able to spot trouble. During the summer of 1857, in response to a broker's question regarding the prospects of the Ohio Life and Trust Company, Leonard was quoted as saying he wouldn't buy the shares at half the current price. A month or two later, Ohio Life would declare a very visible and market-shaking bankruptcy.

Clara convinced Leonard to spend 1858 in Paris in an apartment on the Champs-Élysées. Clara was fascinated by Emperor Louis Napoleon's court, and specifically the Empress Eugenie. Leonard found the court admirable but complained that the horses available for riding were expensive and mediocre.

On their return to New York, Leonard built Clara her mansion. Positioned overlooking Madison Square Park, the façade of red brick and white marble was described by Anita Leslie as "a strawberry pie amidst rows of chocolate blancmanges." One wing of the structure would contain an ornate horse stable paneled in black walnut and above the stable a 600-seat private theater in which Leonard would indulge his passion for music and opera.

Clara and Leonard were raising four daughters (one of whom would die in childhood), and the girls inherited Leonard's love of music and Clara's love of aristocracy. Clara worried that her daughters' musical passions were a little too pronounced for court, where technical proficiency and spirited performing were considered a bit undignified.

The Civil War years had been good ones on Wall Street—and for Leonard Jerome. Churchill biographer David Lough speculated that control of certain telegraph lines permitted Leonard to obtain battlefield news before others. What is known is that his friendship with Cornelius Vanderbilt resulted in concurrent interests in certain railroad concerns that had the effect of doubling Leonard's fortune from $3 to $6 million during the war. The war's end found Leonard Jerome a Wall Street titan, in both wealth and influence.

It was at this pinnacle that Leonard Jerome debuted his great creation, Jerome Park Racetrack in the West Bronx. The initial meeting was in September 1866, with Civil War hero Ulysses S. Grant the guest of honor. It was the first such horse racing event in North America patterned after such meetings in England. Leonard hoped the park would make money but was willing to lose up to $25,000/year to support the venture. Historian David Black records that he also provided that "those who could not afford the entrance fee could witness the contests…from public ground."

The post-war years would be financially dicey, however, as the war spending stopped and the US government revived the gold backing of the US dollar. Leonard Jerome appears to have weathered the sharp break in stock prices that followed Jay Gould's manipulation of the gold market in September 1869, but he had other problems.

Leonard Jerome appears to have underestimated the power of the technology that in many cases he had financed. He controlled the Pacific Mail Steamship Company, which dominated mail service between the country's two coasts. During the 1860s, his shares of Pacific Mail increased smartly in value. Late that decade he planned an additional issuance of shares in the firm and took a large portion of those shares himself at $200 apiece. The transcontinental railroad was nearing completion, however, and rail competition would soon dent the company's prospects. The shares of Pacific Mail did not trade at anything close to that $200 price. *Harper's Weekly* concluded a few years later, "This was the turning point in his own fortune."

Leonard does not appear to have discussed these financial reverses with the family. The two older girls were teenagers, and they spent hours each day playing piano, singing and attending the opera. The Jerome women were invited to weekend retreats with the French court and gave little thought to the bills for the required dresses and jewels. They made quite a splash wherever they went, young Jennie especially. Oxford historian and Churchill biographer Paul Johnson wrote that in London, she was "the most desirable lady in Mayfair…not just because of the sheer physical allure of face and figure but because she looked, moved, talked, laughed and danced with almost diabolical magic." Years later she confessed, "I shall never get used to not being the most beautiful woman in the room."

The Jerome women were in Paris when the French army was routed in September 1870 in the Franco-Prussian War, and they caught one of the last trains out of town. Leonard leased the mansion to the Union League Club for $25,000/year and joined them. The family spent most of the next nine months in London before returning to their Parisian apartment to assess the damage. Clara heard that a mob was ransacking the Tuileries Palace she loved so dearly, and she hurried there

and saw the contents of the Palace being auctioned off on the lawn outside. She bid on Napolean's porcelain dinner service with the prominent golden "N" displayed beneath the imperial crown and had the service wheeled home. The service later ended up in Winston Churchill's dining room, to the considerable surprise of some of Mr. Churchill's French guests.

Leonard was pulled back to Wall Street, but not with the drive he once felt. Now it was strictly to make money to support his family in the style to which they had become accustomed. It was difficult. The market did not cooperate. The Panic of 1873 found him on the long side—the wrong side. Leonard was entertaining friends at dinner when he was handed a telegram which he read and laid aside. When the dinner was over, he stood and asked his guests to allow him to read the telegram, telling them, "It is a message in which you are all interested. The bottom has fallen out of stocks and I am a ruined man. But your dinner is paid for, and I did not want to disturb you while you were eating it."

It wasn't quite as bad as that. Leonard had already settled a good-sized fortune upon his wife, but his Wall Street reputation would never really recover. Such is the fickleness of a Wall Street reputation for prescience, even today.

Leonard received a letter from his wife shortly thereafter, and in his distracted state the meaning conveyed by her hurried handwriting was difficult for Leonard to ascertain. It seems their second daughter, Jennie, had become engaged to a young Englishman, one Randolph Churchill, a mere three days after having met him! Worse yet, Randolph's family—especially Randolph's father, the Duke of Marlborough—was aghast at his son's attachment to an American of whose family he knew and understood little. Clara was in turn furious at the thought that her daughter was unacceptable, and initially Leonard tried to calm her down via the post. When fully apprised of the duke's opposition, however, Leonard refused to consent as well.

Clara took her daughters to Paris, and at a distance, cooler heads prevailed. Randoph Churchill and Jennie Jerome were married in April 1874. Their first child, Winston Leonard Spencer Churchill, was born prematurely in November.

Leonard Jerome was no longer an influential Wall Street multimillionaire, but he was still the delightful companion he had always been. Future son-in-law Moreton Frewen—another British aristocrat—remembers visiting New York, and "my predestined father-in-law…one of the kindliest of men, was the center of a brilliant coterie…witty Bill Travers…equally witty Senator Evarts…and travelled men blew in from the uttermost ends of the earth."

Library of Congress HABS Collection

The Leonard W. Jerome Mansion (built 1859), located at 26th Street and Madison Avenue, New York City.

Leonard Jerome's magnetic personality was in sharp contrast to that of his young grandson. Winston impressed nobody in his early years. He inherited none of his mother's beauty, and his schoolmasters labeled him "backward except for complicated games with toy soldiers," adding that it was "very difficult to tell what goes on in his mind." His maternal grandfather liked the little chap, however, and he was unconcerned. "Let him be," Leonard counseled. "Boys get good at what they find they shine at."

Leonard's last days were spent in England with his wife and daughters and their families. On his deathbed, thinking perhaps of more than money, he told his tearful wife and daughters, "I've given you all I have. Pass it on."

It was a decade after Leonard Jerome's death in 1891 that grandson Winston began to shine with brilliant reporting on the Boer War in South Africa. Fellow correspondent George W. Steevens explained, "From his father Winston derives the hereditary aptitude for affairs," and from his mother "came the shrewdness, keenness, personal ambition and sense of humor." Churchill biographer Paul Johnson agreed, writing that "it was…from his mother that Winston derived his salient characteristics: energy, a love of adventure, ambition, a sinuous intellect, warm feelings, courage and resilience, and a huge passion for life in all its aspects."

The Jerome family history suggests that Winston Churchill's sense of humor, if such a trait can be traced genetically, was his grandfather Leonard's gift. A short summary of the life of that grandfather should therefore end not with yet another Winston Churchill anecdote, but with one of his grandfather's minting.

Leonard Jerome was lunching with fellow financier August Belmont in the 1880s when an eavesdropper heard the conversation turn to one Fanny Ronalds, a celebrated singer and beauty who had captivated both Jerome and Belmont some 20 years earlier.

"August, do you remember Fanny's celebrated ball?" Leonard asked.

"Indeed, I ought to," answered Belmont, "I paid for it."

"Why, how very strange," Leonard responded slowly, wistfully. "So did I." $

Daniel C. Munson is the author of the new book Fiscal Follies: A Little Fun with Economics (and Economists).

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The Silver Panic

Silver Legislation and the Panic of 1893

Library of Congress

By Eric Brothers

"Our public men have had almost no training in economics or finance. Very few people knew what the monetary system of the country was by law."

— Economist Francis A. Walker, 1893

Panic hit Wall Street the first week of May 1893. On May 7, *The New York Times* reported that "it reached its most acute stage on Friday morning, when for nearly two hours it seemed as if the whole Street would go down in a crash…by the afternoon there had been a rebound of prices almost as great as the morning fall…the market was feverish, and from feverishness it is likely to quiet down into a weak dullness, like a patient who has been exhausted by violent spasms."

Industrialist and philanthropist Andrew Carnegie wrote powerfully about the panic in September of 1893:

> It is doubtful if a more disastrous financial cyclone ever blasted a country to such an extent in such a short time…hundreds of thousands of workmen idle, when before every one was employed…the sufferers among the wage-earning classes are already numbered by hundreds of thousands. The country has fallen from the apex of prosperity to the depths of industrial depression. Adversity has taken the place of prosperity; stagnation in business has succeeded activity; confidence has given place to distrust; and, as is always the case when business is disturbed, the chief part of the loss or suffering is falling, and must fall, upon the workingmen—upon the

Drawing of panicked stockbrokers on May 9, 1893, from *Frank Leslie's Illustrated Newspaper.*

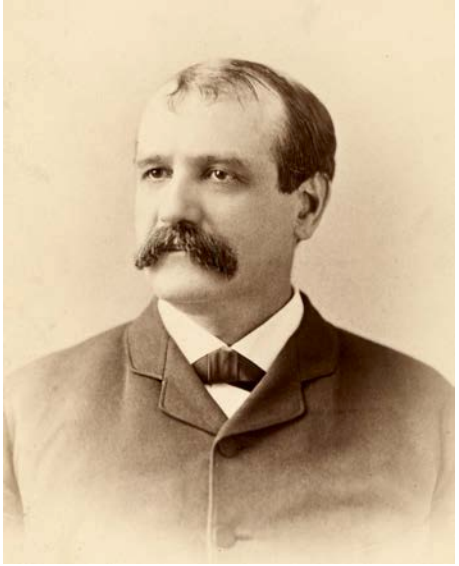
poor millions and not the rich few… Upon the millions of poor people alone will come deprivation, restricted comforts, poorer food and clothing; and upon many absolute want.

Panic a Result of the Free Silver Movement

The Panic of 1893 should never have happened. It was completely avoidable. The panic was forced upon the American people by the free silver movement that began in 1876. Free silver is the ability to bring silver bullion to a US Mint and have it turned into unlimited coinage with no seigniorage charge. Among the supporters of free silver were silver mine owners, farmers who thought that an expanded money supply would raise the price of their crops and debtors who hoped it would enable them to pay off their debts more easily. For true believers, silver became a symbol of economic justice for masses of Americans. However, it was a colossal sham perpetrated upon the citizenry. The movement was insidious and delusional.

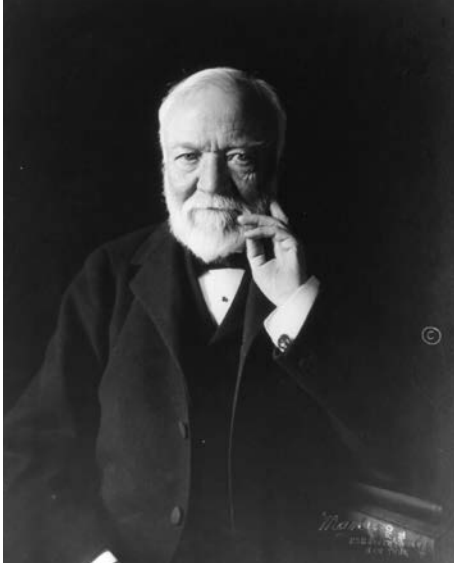
Two pieces of silver legislation—the Bland-Allison Act of 1878 and the Sherman Silver Purchase Act of 1890—obligated the US Treasury to purchase (from February 28, 1878 to June 1, 1893) 443,705,811 ounces of silver (equal to 15,212 tons) at a cost to taxpayers of $451,790,831. From 1878 to June of 1893—a period of only 15 years—419,332,305 silver dollars and their paper equivalencies (silver certificates and Treasury notes) were forced into circulation. The Treasury also purchased 123,911,185 ounces (uncoined) of fine silver, which cost taxpayers an additional $114,299,757.

Readers may assume that the purchase of that much silver and the striking of hundreds of millions of silver dollars (as well as the printing of vast amounts of paper currency) must have been due to a great financial and economic need. It was not. Not one single silver dollar, silver certificate or Treasury note was ever needed—period. It was merely a scheme driven by the free silver movement. The existing greenbacks, national bank notes and gold certificates in circulation were sufficient to maintain the US economy.



MIT Museum

Portrait of economist Francis A. Walker, circa 1885. In 1893, he wrote, "Our public men have had almost no training in economics or finance. Very few people knew what the monetary system of the country was by law."



Library of Congress

Portrait of industrialist and philanthropist Andrew Carnegie, circa 1913. He wrote of the Panic of 1893, "It is doubtful if a more disastrous financial cyclone ever blasted a country to such an extent in such a short time."

In October of 1893, Charles S. Smith wrote in the *North American Review*: "In my judgement [the panic] is to be attributed to unwise legislation with respect to the silver question; it will be known in history as the 'Silver Panic,' and will constitute a reproach and an accusation against the common sense, if not the common honesty, of our legislators who are responsible for our present monetary laws."

Silver Situation in the 1870s

The production of silver in the western mines soared during the 1870s, reaching 17,789,000 ounces in 1871, surging up to 27,650,000 ounces in 1873 and rising even further to 29,650,000 ounces by 1876. As production ramped up, the price began to fall. From 1834 to 1873, the official US bimetallic silver-to-gold ratio was 16:1. The Coinage Act of 1873 demonetized silver, making silver coinage subsidiary and eliminating the standard silver dollar that contained 371.25 grains of silver. The United States was now on the gold standard.

In 1871, Germany demonetized silver and adopted the gold standard. The early 1870s saw the Latin Monetary Union (France, Belgium, Italy, Switzerland and Greece) with a bimetallic ratio of 15.5:1. By 1873, the decreasing value of silver had made it profitable to mint silver in exchange for gold in the Union at their standard. The fear of an influx of silver coinage led the Union, in a Paris meeting of January 1874, to suspend the free coinage of silver in their mints, and by 1878, with the price of silver continuing its downward fall, the Union permanently suspended the free coinage of silver. All other European nations also suspended free coinage of silver in their mints.

After 1873, the silver standard remained only in Mexico, the Orient (China, Hong Kong, the Straits Settlements and the French colonies in Southeast Asia) and British India. In the West, silver coinage on a bimetallic standard was passe. However, one nation—the United States—endeavored a renaissance of silver coinage in a big way.

The Bland-Allison Act (1878)

Flying in the face of common sense, the Bland silver bill, named for Representative Richard P. Bland of Missouri, passed the House of Representatives in November of 1877. The bill intended to reestablish the bimetallic gold-silver double standard—and included the unlimited coinage of silver via free silver. However, amendments proposed by Senator William B. Allison of Iowa in the Senate Finance Committee were adopted, which included removing the free silver coinage provision. Also, the bimetallic double standard was not restored. Allison included silver certificates—paper money that would be backed by silver dollars stored in Treasury vaults.

A well-circulated 1893-S (San Francisco Mint) Bland silver dollar. After the British closed their mints in India to the free coinage of silver on June 26, 1893, the intrinsic value of a silver dollar dipped to 52 cents. That was the lowest value to which silver had ever fallen

Replacing the free silver plan was a requirement that the Treasury purchase, at the official ratio, a minimum of $2 million and a maximum of $4 million worth of silver bullion each month. That bullion was to be struck, as fast as possible, into silver dollars. The Bland-Allison Act became law on February 28, 1878, after a congressional override of President Rutherford B. Hayes' veto on the same day.

The silver dollars to be struck under Bland-Allison were valued at the official US Mint ratio of 16:1 (silver to gold). However, the market value of silver in the dollar coin in 1878 was around 18:1, giving it an intrinsic value of $0.7734. Economist F.W. Taussig wrote of Bland-Allison, "There was no basis of experience from which to predict the effects of the regular injection into the currency of a country of an overvalued coin, limited in quantity, yet unlimited in its legal tender character."

When the government made it its business to purchase large quantities of silver bullion for coinage, and paid more for it in gold than it was worth in the marketplace, it forced the volume of silver in circulation to exceed its actual demand. Never before did the US government purchase gold or silver bullion wholly with its income. It never did for gold what it did for silver.

Economist J. Laurence Laughlin wrote, "This mechanical and forced coinage of fixed amounts of silver each month, irrespective of the desires of the business community or the needs of exchange, was flying in the face of the principal of demand and supply. The legislators in 1878 had committed to repeal the laws of demand and supply."

The Sherman Silver Purchase Act (1890)

The free silver movement continued its populist agitation, resulting in congressional legislation that compelled the Treasury to buy even more silver than under Bland-Allison. The Sherman Silver Purchase Act of July 14, 1890 raised the amount of silver bullion the government was forced to purchase each month to 4.5 million ounces—an increase of 50%. That was about the entire production of American silver mines. Of that amount, $2 million each month was to be struck as silver dollars. The remaining silver bullion was made into silver bars and stored in Treasury vaults. Silver certificates continued to be printed unabated along with silver dollar production.

Economist Neil Carothers wrote, "So open was the intent to take care of the silver market that the framers of the law did not trouble themselves with provision for the coinage or other disposition of all the metal to be purchased."

The new law required the Treasury to buy this silver with a special new issue—Treasury notes (issued from 1890 to 1893)—that could be redeemed in either silver or gold. This resulted in a dramatic expansion of the circulating currency, however without a proportional growth of the nation's gold reserve. This act did not authorize the free and unlimited coinage of silver that supporters of free silver desired. However, it did put pressure on the Treasury's gold reserve and pushed the US economy towards the silver standard.

Pressure on Gold Reserve Leads to Panic

Writing in 1893, economist Francis A. Walker discussed that many people felt that America should "go it alone" in supporting the value of silver. He felt that this view was disingenuous, and wrote, "It is done to the influence of the silver-mining interests, reckless as to the general welfare and willing to do anything which will temporarily enhance the value of their products, regardless of what may befall in even a near future."

National Archives Foundation

Silver miners in the Comstock Lode, Nevada. In essence, the Bland-Allison Act (1878) and the Sherman Silver Purchase Act (1890) created a taxpayer-sponsored boondoggle of over $565 million to the silver industry.

European investors had noticed that while the US gold supply was rapidly and seriously contracting, its gold obligations, via the compulsory purchase of silver bullion in the amount of 4,500,000 ounces monthly, and the issuance of Treasury notes, exchangeable in gold, were just as briskly increasing. This resulted in distrust of the United States to continue making its gold payments. Carnegie wrote, "People abroad…decided that it was safest to withdraw all their money from our country… and quietly began to drain our country of its gold, leaving us the silver, of which we seemed so fond."

From 1888 to May 1893, when the panic struck, $328,247,884 worth of gold had been exported, while during the same period gold imports totaled only $114,683,035. That was a net loss of $213,564,849. Writing in July of 1893, Edward O. Leech, the former mint director, reported that gold coin and gold certificates in circulation decreased during the previous year by $56,790.953. However, silver dollars, silver certificates and Treasury notes increased at the same time by $41,218,502. The market price of silver continued to drop. It had fallen from 96 cents an ounce on April 1, 1890 to 82 cents an ounce on March 23, 1893, while the intrinsic value of the silver dollar dipped from 74½ cents to 63½ cents.

The panic intensified when the British closed their Indian mints to the free coinage of silver on June 26, 1893. They did this because the value of silver money in India had depreciated over time by more than one-third. A few hours after the British published the new gold values of silver rupees—at 16 d. replacing the original value of 24 d.—silver dropped 23% in value, which made the intrinsic value of a silver dollar only 52 cents. That was the lowest value to which silver had ever fallen.

Carnegie explained that most business was not conducted by an exchange of currency notes or even gold and silver. This was the "small change" that accounted for no more than one-twentieth of all business transactions. All large transactions were made upon credit—pieces of paper—and payable on time. The seller must know what type of money he will be paid and the buyer what type of money his is to pay. In September 1893, Carnegie wrote, "Will it be in gold, worth 100 cents on the dollar anywhere in the world, or will it be in silver, worth only 52 cents per dollar?"

The industrialist mentioned that the Act of 1890 stated its policy was to keep all Treasury notes payable in gold. But the question to the man of finance was how could the government "pay in gold all the notes it has issued, and is still issuing, when it is losing its gold so fast, and every month increasing its notes? The Government has today less than 100 millions of dollars in gold, and is already pledged to pay in gold notes to the amount of more than eight hundred and fifty millions of dollars."

Bureau of Engraving and Printing

Treasury note of 1891 for $50, bearing the image of Secretary of State William H. Seward. These notes were issued in 1890–1893 as a provision of the Sherman Silver Purchase Act. Such currency drained the Treasury of gold, as they were redeemable in either gold or silver.

The Sham of the Free Silver Movement

This movement, which brought about the Panic of 1893, promised much and delivered nothing. T.V. Powderly, a fervent advocate of free silver, was the general master workman of the Knights of Labor. In 1891 he wrote, "'If free and unlimited coinage is restored, it will benefit the owners of silver mines and give an 80-cent dollar to circulate with the gold dollar,' is [a] fear entertained." In fact, the silver mine owners benefited greatly via the Sherman Silver Purchase Act—with virtually all of their silver production (4.5 million ounces) being bought by the government every month. They did not need free silver for that. And, in 1893, there was a 52-cent dollar—not "an 80-cent dollar"—that circulated with the gold dollar.

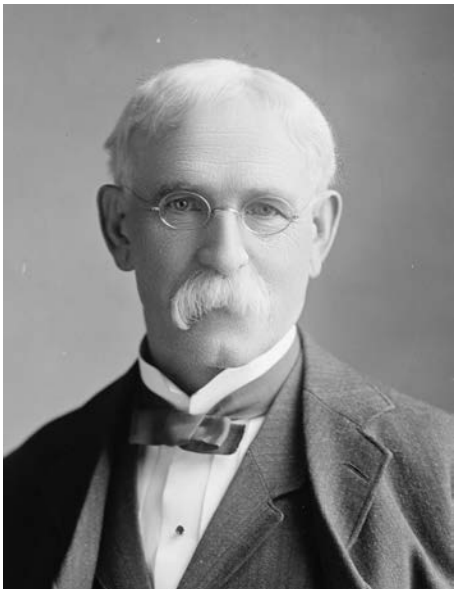
Daniel W. Vorhees, a free silver Democratic senator from Indiana, wrote in 1891, "In American history the silver dollar has a peculiarly glorious origin, exalted sanction and useful career…the dollar…for 84 years rendered its constant and indispensable aid to the trade, commerce and prosperity of the American people."

Yet economist Simon Newcomb wrote in 1879, "It would probably be safe to assert that…one half of the citizens of our country, born since 1840, had never seen a United States silver dollar; if it should be shown that one half of our people had seen a silver dollar some time in their lives, we could fall back on the well-known historic fact that the dollar in question was rarely used as money after 1840."

The vast majority of silver dollars, struck from 1878 to 1893 (and beyond), called Bland dollars, did not circulate. Circulating silver currency generally took the form of silver certificates, paper money that was backed by millions of silver dollars that languished in Treasury vaults. Did the silver dollar "aid to the trade, commerce and prosperity" of Americans? Historian Worthington Chauncey Ford wrote in 1889, "Of the total coinage [of silver dollars] effected in the 12 months ending June 30, 1888, less than $40,000 passed out of

Library of Congress

Congressman Richard Bland of Missouri, who wrote the Bland bill, which eventually became the Bland-Allison Act of 1878.



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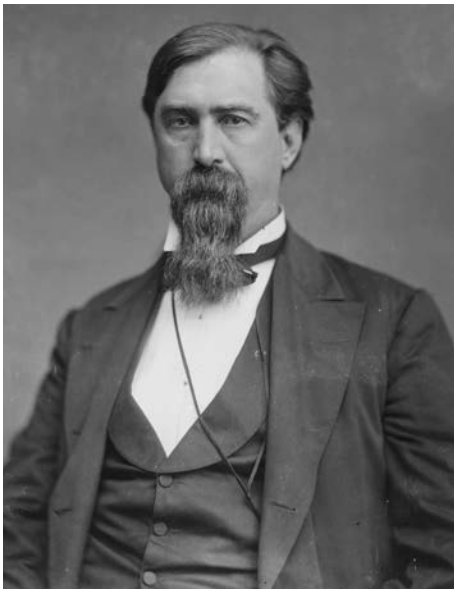
T.V. Powderly, the general master workman of the Knights of Labor, was a fervent advocate of free silver.



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Senator Daniel W. Voorhees of Indiana, who was a strong supporter of free silver.

the Treasury, or only one-tenth of the 1% of the year's coinage."

"There will be more money in the hands of the people," wrote Powderly, "in bonafide circulation, if free coinage of silver is restored to where it was up to 1873." Free silver existed from 1853 to 1873 for no denomination except for the silver dollar. That was a nod to merchants, who shipped them in trade to China, for the silver dollar never circulated domestically. There were virtually no silver dollars "in the hands of the people" from 1794 to 1873.

Free silver was government policy from 1794 to 1853. It was dropped via the Coinage Act of 1853, for the California Gold Rush (1848–1855) saw the price of silver rise. That resulted in all silver coins having an intrinsic value greater than their face value. Thus, they were hoarded, sold for their bullion value or exported. The Act of 1853 made subsidiary coins worth less than their face value to prevent their export—and ended the free silver policy for such coins.

Powderly wrote, "The cry that 'we will have too much money if silver is remonetized' is unworthy of consideration… Hard times and panics are due to contractions and not expansions of the currency."

Powderly was dead wrong. Silver was not remonetized and the United States indeed had "too much money." The overproduction of over-valued silver dollars beginning in 1878 (and printing of silver certificates)—plus the issuance of Treasury notes on silver bullion from 1890 to 1893—increased the nation's silver and paper circulation by 75% from 1879 to 1893. The expansion of the money supply was a key policy of the free silver movement. And that policy—forced upon America via Bland-Allison and the Sherman Silver Purchase Act—was instrumental in causing the Panic of 1893.

The Repeal of Silver Legislation

President Grover Cleveland delivered a message to Congress in August of 1893, urging the repeal of the Sherman Silver Purchase Act. The government, he urged, should avoid "financial experiments" and in their place enact "sound and stable" currency reform. He noted that repealing the law may be unpopular, for some businesses and speculators profited from this silver legislation. Nonetheless, Cleveland argued that Congress should act quickly to end the draining of the gold reserve and set the US economy on the right path. Shortly thereafter, Congress repealed the Sherman Silver Purchase Act. $

Eric Brothers is a regular contributor to Numismatic News. *He also writes for* ANS Magazine, *a publication of the American Numismatic Society in New York. This is his ninth article for* Financial History.

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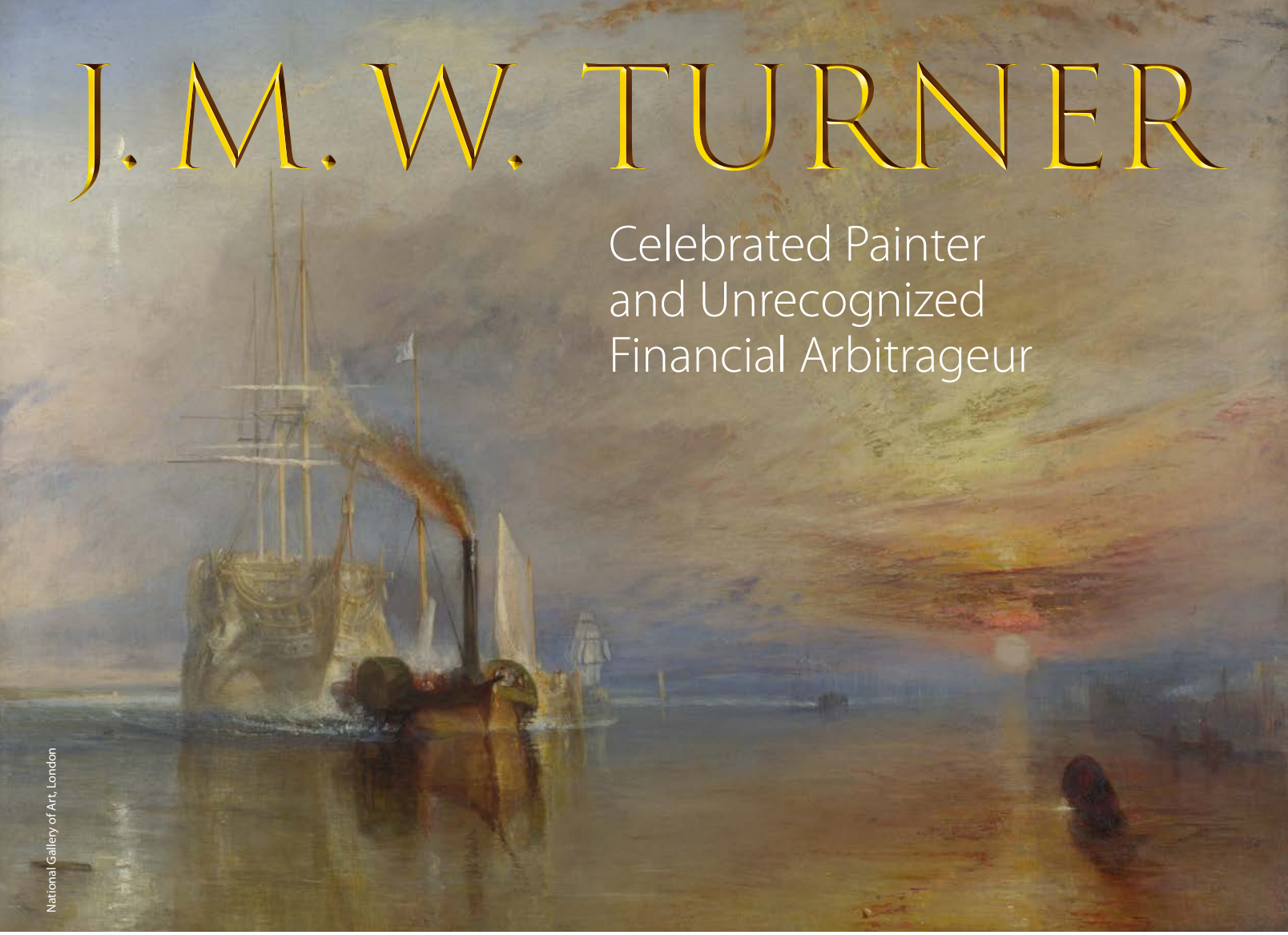
J. M. W. TURNER

Celebrated Painter and Unrecognized Financial Arbitrageur



National Gallery of Art, London

By Andrew Odlyzko

Joseph Mallord William Turner (1775–1851) is famous for his oil paintings, watercolors and drawings. His pioneering work in the graphical arts continues to be admired, enjoyed and celebrated, and many special exhibits in museums around the world have commemorated the 250th anniversary of his birth this year.

What has not been discussed are Turner's forays into risk-free arbitrage of British government securities. Those forays were also unknown to the public in his lifetime, and that is easy to understand. They were few in number and involved minor sums that were too small to move market prices. However, they are of interest for a few reasons.

The Fighting Temeraire, oil on canvas, by Joseph Mallord William Turner, 1839.

First, they show a fascinating side of Turner that was not known before—an artist who was financially sophisticated. Second, and more important, they illustrate what might be regarded as incomplete development of the British financial markets. Even though they were the most sophisticated in the world at the time, they produced very obvious pricing anomalies that Turner occasionally exploited. The big question is how those anomalies managed to persist for extended periods. Evidence suggests that cultural inhibitions stopped most participants from taking advantage of the arbitrage opportunities. It appears that it required eccentrics—such as Turner—to overcome those constraints.

John Constable, another famous painter of that period, wrote of Turner that "he is uncouth but has a wonderful range of mind." And, indeed, Turner had a wide range of friends and acquaintances, and not just among artists. But he was certainly "uncouth," not one of the "well-bred gentlemen" of his age. In particular, he was called a miser, with an unseemly preoccupation with money. This was rather unjust, as he left his entire estate to the public. It consisted of a very large and priceless collection of his works, along with a very substantial financial legacy, about £80,000, comparable to between $10 million and $200 million today, depending on whether one uses inflation adjustments or scales by per capita GDP.

Available evidence led Turner's biographers to believe he did not have a bank account, and when he accumulated substantial cash, he invested it through his broker in government securities. However, this conclusion was based on very fragmentary evidence. Much more can be done.

Details of Turner's dealings in government securities are available in full detail in the ledgers in the Bank of England Archive and have not been previously

explored. The broad pattern observed in his accounts is that of slow accumulation of very secure government bonds. However, although he was not a frequent trader, he did engage in some complicated moves that would require more work to understand. No attempt is made in this article to explicate those, or to evaluate his entire investing career. Instead, two cases are examined in which he did risk-free arbitrage. These examples demonstrate that even in the world's most sophisticated market of the time, opportunities for such arbitrage did surface—often the result of financial innovations by the government—and that there seemed to be some reluctance on the part of ordinary investors to take advantage of them.

Self-portrait of Joseph Mallord William Turner, oil on canvas, 1798.

Financial Innovations and Unsophisticated Experts

Novel financial instruments often surprise their inventors with the ways they end up used and abused. This is true today, and it was true centuries ago. The only difference is that the level of sophistication of both the securities and the people dealing with them were lower in earlier times.

Richard Price was a famous philosopher, mathematician and demographer of the late 18th century. However, the Sinking Fund (which repurchased in the market government bonds) and his faulty Northampton Tables of Mortality led to substantial losses to tax-payers. Those losses were not stopped until the late 1820s.

In 1829, the British government restarted sales of life annuities, using correct mortality tables. The new tables were sound, but the pricing of the life annuities did not take into account adverse selection. The rules allowed for the purchase of annuities for the life of any person—even individuals unrelated to those purchasing the policy—and up to the age of 90. Therefore, some enterprising people purchased annuities for the lives of elderly individuals who were in excellent shape and lived in healthy parts of the country. Reportedly, in many cases, they even provided extra care for the nominees, to prolong their lives. This led to substantial losses to the taxpayer and—although the government periodically tightened the rules—investors found ways to keep profiting.

A related government mispricing led to Turner's gains. In November 1829, as the government started selling the new life annuities, it also offered investors terminable annuities. Today, the actuarial term for these is "annuities certain," and they consist of a fixed number of equal payments in return for an initial lump sum. At that time, the GDP of Great Britain (so excluding Ireland) was approximately £400 million, with a population of about 16 million. The national debt was around £800 million, so about twice the GDP (or somewhat less if we include Ireland); almost all of it consisted of perpetual annuities. Those could not be cashed in by investors, only sold on the open market, but the government could call them in at their par value. The largest of those were the famous Consols, and they formed about half of the total debt. Paying just the interest on all the annuities consumed about half of the national budget.

In 1829, in addition to Consols and other perpetual annuities, there were the aforementioned life annuities and some terminable annuities. The largest of the latter were the long annuities (LA). They paid interest twice a year, on April 5 and October 10, through October 1859, with a final quarter-year payment on January 5, 1860. In 1829, paying them cost the government £1.36 million per year. £1 per year of LA was valued in the market at about £19, so LA in total were worth about £25 million, or roughly 3% of the national debt.

On Monday, November 23, 1829, the government started selling new terminable annuities. Those annuities could be for essentially any number of years, and they paid interest on the same dates as LA. In particular, they could be bought for 30 years, with the last payment due on October 10, 1859, and they will be referred to here as TA. They were to expire at almost the same time as LA, except that LA had that final £0.25 payment coming on January 5, 1860, a payment that was worth about £0.10 in 1829. The £0.10 was about 0.5% of the LA price in 1829, so this made a non-trivial difference, although not enough to destroy the rationale for the arbitrage to be described. As is shown by the ledger C73/14 in the Bank of England Archive (which is the basis for most of the evidence for this article), practically all of the new terminable annuities sold through January 5, 1830 were TA. And almost two-thirds of them were purchased by exchanging LA for them.

The intention of Parliament was that the new terminable annuities would be purchased primarily by exchange from perpetual annuities. This resulted from an almost universal (but fallacious) notion prevailing at that time that the best way to force Parliament to reduce the gigantic national debt was to move from perpetual to terminable annuities.

Although the intention was to sell the new annuities in exchange for perpetual ones, the published rules allowed them also to be sold by exchanging LA for them. Further, the interaction of LA market prices and the price tables meant that there was a clear gain by swapping LA for TA. On the first date of sales, Monday, November 23, 1829, there were three purchases of the new annuities—all of TA, and all by exchanging LA for them. All three buyers were members of the London Stock Exchange. One of them exchanged £289 per year of LA for £300.15 per year of TA, so a gain of 3.86% nominally, as was usually reported in the press, but really more like 3.4% if one takes into account that stub payment of £0.25 that was due on LA on January 5, 1860.

This was a totally risk-free exchange, one stream of payments from the British government for another, almost identical, and did not require any fees. All an investor had to do was to appear in the appropriate office, sign the papers, walk two blocks to the Bank of England to carry out the transfer of LA to the government and then go back to complete the transaction. The next day, *The Times* of London reported this exchange with some incredulity, as a rumor that was hard to believe. But the next day it confirmed that there was, in fact, free money to be had.

National Gallery of Art, London

Rain, Steam and Speed—The Great Western Railway, oil on canvas, by Joseph Mallord William Turner, 1844.

The swap of LA for TA continued for about six weeks until January 5, 1830 (and resumed on a smaller scale, with a slightly different instrument and lower profits, for a while at the end of January). After the first three swaps of LA for TA on Monday, the next similar moves took place on Wednesday, and this time one of the six investors involved was Turner.

In late 1829, Turner had £527.74 per year of LA, worth close to £10,000, which can be compared to between $1 million and $10 million today. On that Wednesday, November 25, he swapped £20 per year of LA for £20.53 of TA, a gain of about 2.1% (taking into account that small stub payment on LA). How did he learn of this potential? We don't know. And why did he only swap 4% of his LA holdings? Again, we don't know, but the most likely explanation is that he could not believe such an easy way to make money was legal.

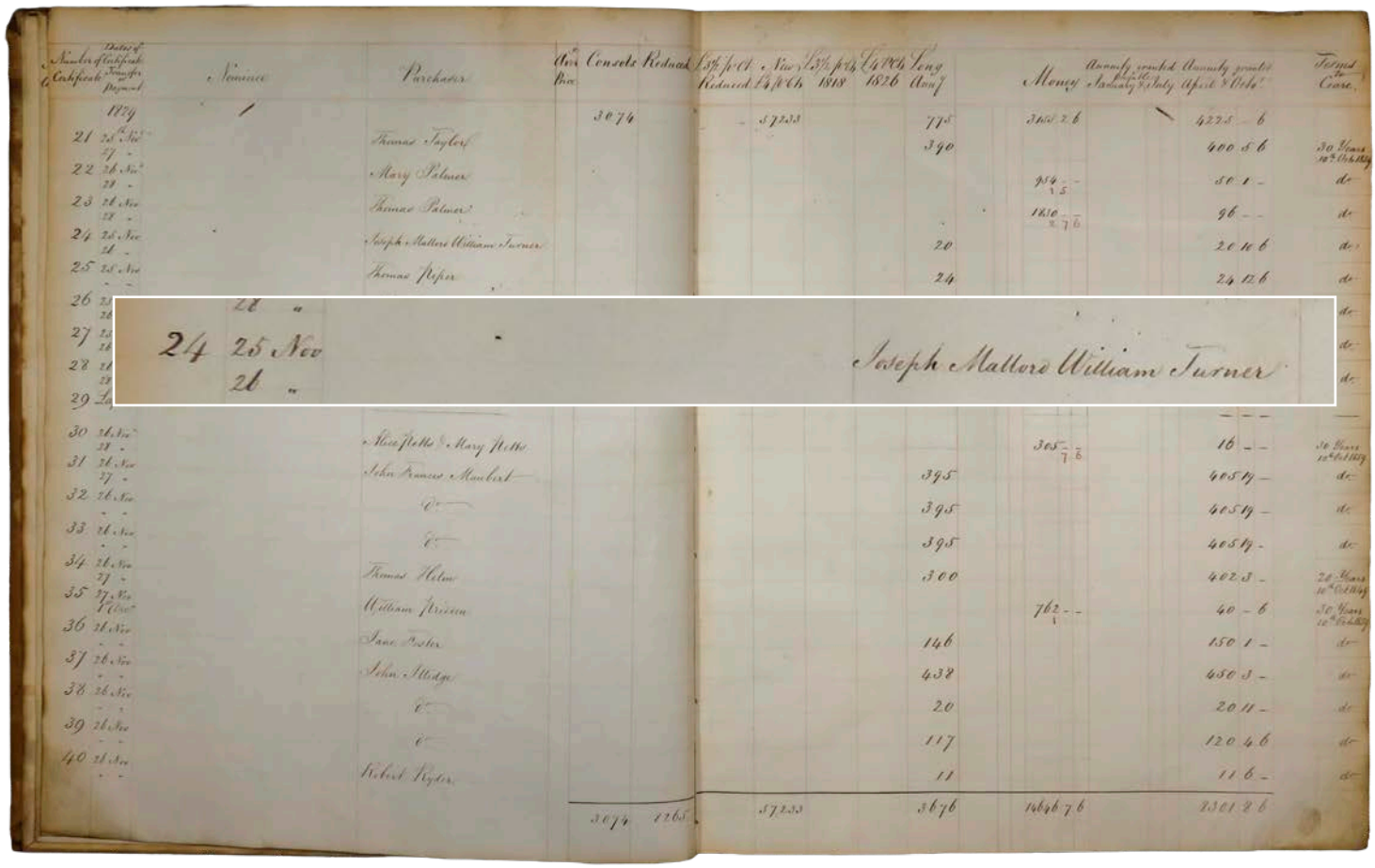
Three weeks later, Turner returned and swapped a larger amount, £300 per year of LA. This time he received £305.75 per year of TA, so a gain of just about 1.4% (after the LA stub correction), due to changes in market prices. This was comparable to a gain of between $10,000 and $100,000. Why did it take him three weeks to come back? And why did he not swap his whole stake in LA at that time, £507.74 per year? Those mysteries may never be solved.

Some puzzles from that moment in financial history can almost surely be solved with more research. Since there are complete records of transactions in LA and TA, it is possible to learn much about the microstructure of the London financial markets, as the London Stock Exchange members played prominent roles.

Culture and Finance

The most important puzzle of the LA to TA swap is the small number of investors who participated. Of the £1.36 million per year of LA, only £125,954 per year, or 9.3%, were swapped for TA by early January 1830. The easily obtainable gains were widely publicized by Thomas Massa Alsager, the most eminent financial journalist of that time in his daily column in *The Times*, which was the most prominent newspaper in Britain. Further, Alsager's writeups on the advantages of TA were cited in many provincial papers. So a lack of information does not seem to be an adequate explanation. General conservatism of British investors was a more likely cause.

An even more important factor seems to have been a cultural inhibition against dabbling in what was somewhat disreputable finance, with the word "jobber" carrying a heavy pejorative connotation. Thus, the *Evening Standard* on November 26 (a day after Turner's first tentative swap), in a diatribe against greed, attacked "the agonizing anxiety manifested about half a pound per cent, and the scrupulous and indignant



C73/14, f.3-4 Courtesy of the Bank of England Archive

Record book showing the first of Turner's 1829 swaps of long annuities (LA) for terminable annuities (TA). His is transaction #24.

jealousy employed in estimating the proportional value of old and new annuities."

Other papers did not come out with such explicit condemnation, but instead responded with silence. There were a few comments about the need for the government to change regulations to avoid losses, and about the high level of activity involving TA. What was lacking was explicit advice to investors to treat themselves to a free lunch. Apparently, this was regarded as unseemly, not to be indulged in by well-bred gentlemen. Turner, not being "well-bred," seems not to have been constrained by such inhibition.

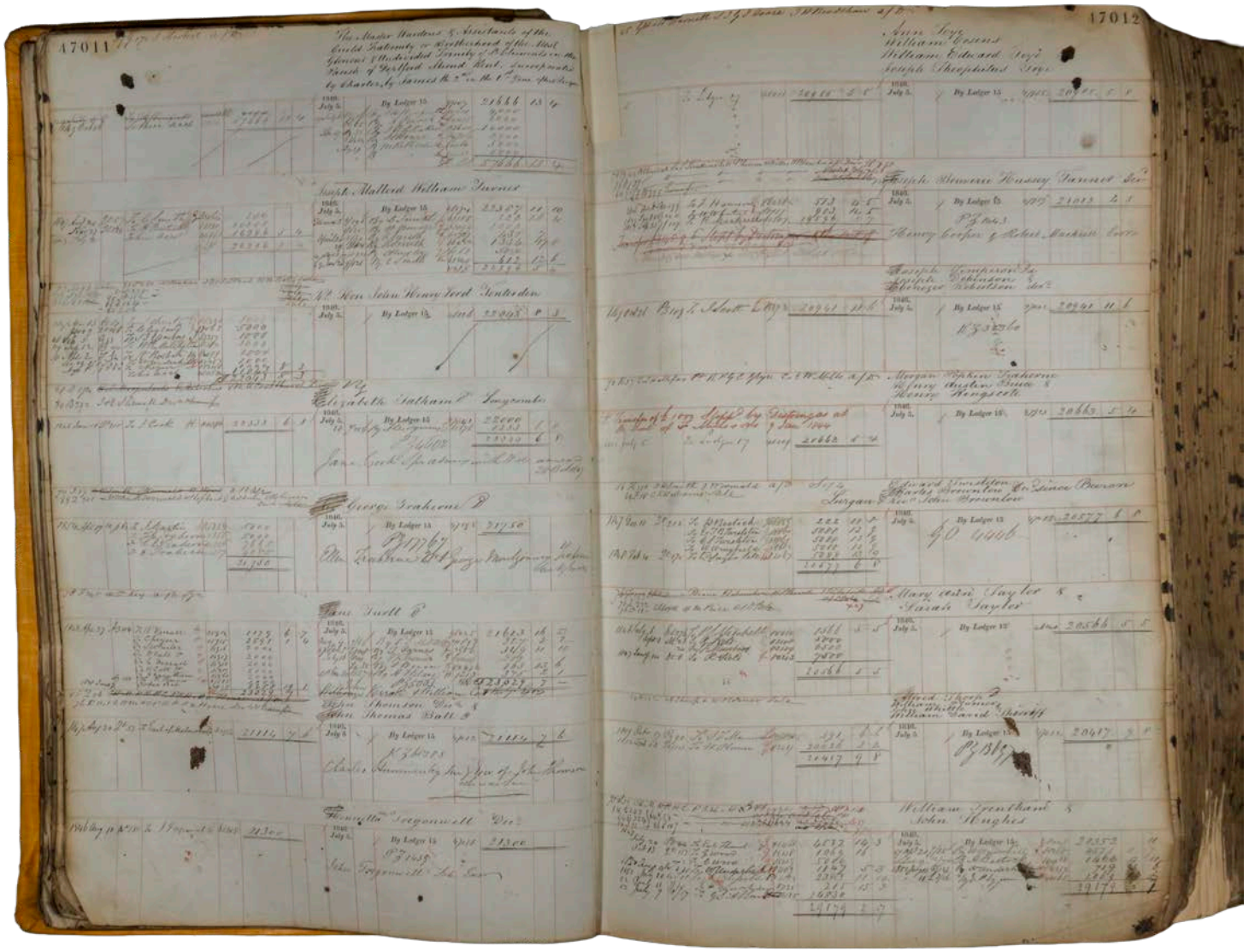
To put this in modern terms, let us recall the famous joke about an economist who believes in efficient markets walking down a street with a companion. That person interrupts their conversation to say, "Look, there is a $20 bill lying on the ground!" To which the efficient market economist responds, "Can't be, if it were a real $20 bill, somebody would have picked it up." Would this anecdote carry the same punch if instead of a $20 bill, it was a dime that was lying on the ground? Might people even think it strange for somebody to bother to pick up a dirty coin? It may be that due to the cultural norms of early 19th century Britain, investors looked at swapping LA for TA similarly to affluent Americans stooping to pick up a dime.

Two Decades Later

The LA to TA swap in 1829 was one of two known cases of risk-free arbitrage by Turner. The other one occurred in 1847. During most of the 19th century, there was a persistent mispricing in the main British government securities. About half of the national debt consisted of the famed Consols, which paid 3% per year, and were perpetual, but could be redeemed by the government. But about 1/6 consisted of the reduced 3% annuities (RA). They also paid 3% per year and were perpetual but redeemable. They differed from Consols in that they paid interest at the beginning of April and October, as opposed to the beginning of January and July for Consols.

Simple calculation shows that rational pricing would have been to have £100 of par value of Consols to be priced almost exactly £0.75 higher than RA in April through June, and also in October through December, and £0.75 lower in the other six months. That was widely recognized at that time, and this relation held at various periods. But most of the time Consols were traded at higher prices than RA, occasionally as much as 2% higher. It's as if a dollar bill with an even serial number would buy two cents more in candy bars than one with an odd serial number. This phenomenon was generally known to contemporaries, and the instances of British financial journalists pointing out the easy gains to their readers are well documented. But few investors did that. One who took advantage of this opportunity was Turner.

Soon after the financial crisis of October 1847, the overpricing of Consols relative to RA increased. That's when Turner acted. He swapped £10,000 (par value) of Consols for the same amount of RA. His broker dealt with the same jobber for both sides of this swap, which should have minimized brokerage and markup



AC27/2222, f.47011-47012. Courtesy of the Bank of England Archive

Record of Turner's account in Consols in 1847, when he exchanged 10,000 par value of them for reduced annuities (RA).

charges. How much cash Turner received is impossible to determine, since we don't know the exact terms of the deal. But it is likely that Turner received £150 in cash, of which half was compensation for the difference in timing of interest payments, and half was for the mispricing. If so, the pure gain of £75 is comparable to between $7,500 and $75,000 today.

As with the LA for TA swap in 1829, we do not know what motivated Turner in this case. He owned somewhat over £25,000 par value of Consols. Why convert just 40% of that? It could be that, just as in 1829, he was not checking market prices diligently, but occasionally took a look, and if something piqued his interest, he acted on it. But whatever his motivation, the most interesting fact is that he did, while the bulk of the British investing public did not. This allowed for the persistence of pricing anomalies.

Turner violated the stereotype of an outstanding artist devoted to his craft but ignorant of financial affairs. But he also showed that British financial markets of the early 19th century were affected by cultural norms that denigrated finance and kept pricing anomalies alive for extended periods. His adventures in finance also illuminate the uncertainties of financial innovation, with its creation of unanticipated anomalies. $

Andrew Odlyzko has had a long career in research and research management at Bell Labs, AT&T Labs and the University of Minnesota, where he is professor emeritus. *He has published more than 150 technical papers in a variety of fields. His current research is centered on technology bubbles and the development of financial systems.*

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TRIVIA QUIZ

HOW MUCH DO YOU KNOW ABOUT FINANCIAL HISTORY?

1. Who was the first female CEO of a major American corporation?

2. What US commodity's annual production totals about $70 billion?

3. What renowned painter engaged in risk-free arbitrage of British government securities in the mid-1800s?

4. Which panic was forced upon the American people by the "Free Silver" movement?

5. Which US President was New York's chief bank supervisor in 1848?

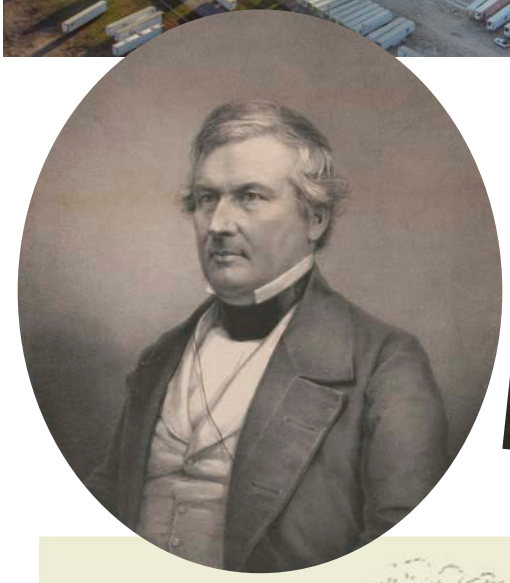
6. Who was the first woman director of a US public company?

7. Who joined the General Foods board in 1936, cementing her place among the first women to hold such a role at a major American corporation?

8. What stolen painting is on the cover of Peter Bernstein book, *Against the Gods,* about how the quantification of financial risk in the 1950s paved the way for modern risk management techniques?

9. What Wall Street figure and grandfather of Winston Churchill had a racetrack named after him in the Bronx, NY?

10. What pioneering executive and civic-minded leader's vision and contributions helped Coca-Cola become the global brand it is today?



1. Anna Bissell (Bissell Carpet Sweeper Company) **2.** Corn **3.** J. M. W. Turner **4.** The Panic of 1893 **5.** Millard Fillmore **6.** Clara Abbott (Abbott Labs) **7.** Marjorie Merriweather Post **8.** Rembrandt's *Christ in the Storm on the Sea of Galilee* **9.** Leonard Jerome **10.** Lettie Pate Whitehead Evans

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